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EDUCATION

- Jan. 1989, **Ph.D. in Electrical Engineering**, Electrical Engineering, UIUC
- July 1986, **M.Sc. in Physics**, Physics Department, Xiamen University, China
- July 1983, **B.Sc. in Physics**, Physics Department, Xiamen University, China

EXPERIENCE

- 2004/1–present, **Full Professor**, Electrical & Computer Engineering, Duke University
- 1999–2003, **Associate Professor**, Electrical & Computer Engineering, Duke University
- 1996–1999, **Associate Professor**, Electrical & Computer Engineering, New Mexico State University
- 2/1994–12/1995, **Program Leader**, Schlumberger-Doll Research, Ridgefield, CT
- 3/1990–12/1995, **Research Scientist**, Schlumberger-Doll Research, Ridgefield, CT
- 12/1988–2/1990, **Postdoctoral Research Associate**, University of Illinois at Urbana-Champaign

AWARDS/HONORS RECEIVED

- Presidential Early Career Award for Scientists and Engineers (PECASE), White House Office of Science and Technology, 1996.
- National Science Foundation CAREER Award, 1997.
- U.S. Environmental Protection Agency Early Career Research Award, 1996.
- Fellow of the IEEE, 2005. For contributions to computational electromagnetics and subsurface sensing applications.
- Fellow of the ASA (Acoustical Society of America), 2005. For contributions to computational acoustics and elasticity.
- Fellow of the Electromagnetics Academy.

PROFESSIONAL ACTIVITIES

- Guest Editor, *Proceedings of IEEE*, Special Issue on “Large Scale Electromagnetic Computation for Modeling and Applications,” published in Feb. 2013.
- Deputy Editor-in-Chief, *Journal of Electromagnetic Waves and Application*, 2009–2013.
- Deputy Editor-in-Chief, *Progress in Electromagnetics Research (PIER)*, 2009–present.
- Guest Editor, Special Issue on Computational Wave Issues in Remote Sensing, Imaging and Target Identification, Propagation, and Inverse Scattering, *IEEE Transactions on Geoscience and Remote Sensing*, published in July 2000 (with W. C. Chew).
- Associate Editor, *IEEE Transactions on Geoscience and Remote Sensing*, 1996–present.
- Associate Editor, *Radio Science*, 2003–2012.
- Associate Editor, *Medical Physics*, 2009–2010.
- Editor, *Journal of Computational Acoustics*, 2010–present.
- Editor in Chief, *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, 2015–present.

PUBLICATIONS

A. Journal Papers

- [1] W. C. Chew, and Q. Liu, “Resonance frequency of a microstrip patch,” *IEEE Trans. Antennas Propagat.*, vol. AP-36, pp.1045-1056, 1988; Correction, vol. AP-36, p. 1827, 1988.
- [2] Q. Liu, and W. C. Chew, “Curve-fitting formulas for fast determination of accurate resonant frequency of circular microstrip patches,” *IEE Proc.*, Pt. H, vol. 135, pp.289-292, 1988.
- [3] Q. H. Liu, W. C. Chew, M. R. Taherian, and K. A. Safinya, “A modeling study of electromagnetic propagation tool in complicated borehole environments,” *Log Analyst*, vol. 30, pp. 424-436, 1989.
- [4] Q. H. Liu, and W. C. Chew, “Surface integral equation method for the analysis of an obliquely stratified half-space,” *IEEE Trans. Antennas Propagat.*, vol. 38, pp. 653-663, 1990.
- [5] Q. H. Liu, and W. C. Chew, “Numerical mode matching method for the multi-region vertically stratified media,” *IEEE Trans. Antennas Propagat.*, vol. 38, pp. 498-506, 1990.
- [6] Q. H. Liu, and W. C. Chew, “A hybrid method for the analysis of complex rectangular dielectric waveguides,” *J. Electromagnet. Waves Appl.*, vol. 5, pp. 253-266,1991.

- [7] Q. H. Liu, and W. C. Chew, "Analysis of discontinuities in planar dielectric waveguides: an eigenmode propagation method," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-39, pp. 422-430, 1991.
- [8] W. C. Chew, Z. Nie, Q. H. Liu, and B. Anderson, "An efficient solution of electrical well logging tools in a complex environment," *IEEE Trans. Geosci. Remote Sensing*, vol. 29, pp. 308-313, 1991.
- [9] W. C. Chew, Z. Nie, Q. H. Liu, and Y. T. Lo, "A rigorous analysis of a probe-fed microstrip disk antenna," *IEE Proc.*, Pt. H, vol. 138, pp. 185-191, 1991.
- [10] M. Moghaddam, W. C. Chew, B. Anderson, E. Yannakakis, and Q. H. Liu, "Computation of transient electromagnetic waves in inhomogeneous media," invited paper, *Radio Science*, vol. 26, no. 1, pp. 265-273, 1991.
- [11] W. C. Chew, L. Gurel, Y. M. Wang, G. Otto, R. Wagner, and Q. H. Liu, "A generalized recursive algorithm for wave-scattering solutions in two dimensions," *IEEE Trans. Microwaves Theory Tech.*, vol. 40, no. 4, pp. 716-723, 1992.
- [12] Q. H. Liu, and W. C. Chew, "Diffraction of nonaxisymmetric waves in cylindrically layered media by horizontal discontinuities," *Radio Sci.*, vol. 27, no. 5, pp. 569-581, 1992.
- [13] Z. Nie, W. C. Chew, and Q. H. Liu, "Electromagnetic scattering from two-dimensional layered media with axial symmetry," *Acta Geophysica Sinica*, vol. 35, no. 4, pp. 479-489, 1992.
- [14] Q. H. Liu, "Electromagnetic field generated by an off-axis source in a cylindrically layered medium with an arbitrary number of horizontal discontinuities," *Geophysics*, vol. 58, no. 5, pp. 616-625, 1993.
- [15] Q. H. Liu, and W. C. Chew, "A CG-FFHT method for the scattering solution of axisymmetric inhomogeneous media," *Microwave Opt. Technol. Lett.*, vol. 6, no. 2, pp. 101-104, 1993.
- [16] Q. H. Liu, "Reconstruction of two-dimensional axisymmetric inhomogeneous media," *IEEE Trans. Geosci. Remote Sensing*, vol. 31, no. 3, pp. 587-594, 1993.
- [17] B. Anderson, Q. H. Liu, R. Taherian, J. Singer, W. C. Chew, B. Freeman, and T. Habashy, "Interpreting the response of the Electromagnetic Propagation Tool in complex lithologies," *The Log Analyst*, vol. 35, March-April, pp. 65-83, 1994.
- [18] Q. H. Liu, and W. C. Chew, "Applications of the CG-FFHT method with an improved FHT algorithm," (invited paper), *Radio Sci.*, vol. 29, no. 4, pp. 1009-1022, 1994.
- [19] Q. H. Liu, B. Anderson, and W. C. Chew, "Modeling low-frequency electrode-type resistivity tools in invaded thin beds," *IEEE Trans. Geosci. Remote Sensing*, vol. 32, no. 3, pp. 494-498, 1994.
- [20] Q. H. Liu, "Nonlinear inversion of electrode-type resistivity measurements," *IEEE Trans. Geosci. Remote Sensing*, vol. 32, no. 3, pp. 499-507, 1994.
- [21] W. C. Chew, and Q. H. Liu, "Inversion of induction tool measurements using the distorted Born iterative method and CG-FFHT," *IEEE Trans. Geosci. Remote Sensing*, vol. 32, no. 4, pp. 878-884, 1994.
- [22] L. Knizhnerman, V. Druskin, Q. H. Liu, and F. J. Kuchuk, "Spectral Lanczos decomposition method for solving single phase fluid flow in porous media," *Numerical Methods for Partial Differential Equations*, vol. 10, pp. 569-580, 1994.
- [23] Q. H. Liu, "Transient electromagnetic modeling with the generalized k -space (GkS) method," *Microwave Opt. Technol. Lett.*, vol. 7, no. 18, pp. 842-848, 1994.
- [24] Q. H. Liu, "Generalization of the k -space formulation to elastodynamic scattering problems," *J. Acoust. Soc. Am.*, vol. 97, no. 3, pp. 1373-1379, 1995.
- [25] C.-C. Lu, and Q. H. Liu, "A three-dimensional dyadic Green's function for elastic waves in multilayer cylindrical structures," *J. Acoust. Soc. Am.*, vol. 98, no. 5, pp. 2825-2835, 1995.
- [26] Q. H. Liu, and C. Chang, "Compressional head waves in attenuative formations: forward modeling and inversion," *Geophysics*, vol. 61, no. 6, pp. 1908-1920, 1996.
- [27] Q. H. Liu, F. Daube, C. Randall, E. Schoen, H. Liu, and P. Lee, "A 3D finite difference simulation of sonic logging," *J. Acoust. Soc. Am.*, vol. 100, no. 1, pp. 72-79, 1996.
- [28] W. C. Chew, and Q. H. Liu, "Perfectly matched layers for elastodynamics: A new absorbing boundary condition," *J. Computational Acoust.*, vol. 4, no. 4, pp. 341-359, 1996.
- [29] B. K. Sinha, Q. H. Liu, and S. Kostek, "Acoustic waves in pressurized borehole: A finite-difference formulation," *J. Geophys. Res.*, vol. 101, no. B11, pp. 25173-25180, 1996.
- [30] Q. H. Liu, "An FDTD algorithm with perfectly matched layers for conductive media," *Microwave Opt. Technol. Lett.*, vol. 14, no. 2, pp. 134-137, 1997.
- [31] Q. H. Liu, "The PSTD algorithm: a time-domain method requiring only two cells per wavelength," *Microwave Opt. Technol. Lett.*, vol. 15, no. 3, pp. 158-165, 1997.
- [32] Q. H. Liu, and J. Tao, "The perfectly matched layer (PML) for acoustic waves in absorptive media," *J. Acoust. Soc. Am.*, vol. 102, no. 4, pp. 2072-2082, 1997.

- [33] Y. H. Chen, W. C. Chew, and Q. H. Liu, "A three-dimensional finite difference code for the modeling of sonic logging tools," *J. Acoust. Soc. Am.*, vol. 103, no. 2, pp. 702-712, 1998.
- [34] Q. H. Liu, and N. Nguyen, "An accurate algorithm for nonuniform fast Fourier transforms (NUFFT)," *IEEE Microwave Guided Wave Lett.*, vol. 8, no. 1, pp. 18-20, 1998.
- [35] C. Chang, and Q. H. Liu, "Inversion of source time function using borehole array sonic waveforms," *J. Acoust. Soc. Am.*, vol. 103, no. 6, pp. 3163-3168, 1998.
- [36] Q. H. Liu, "The PSTD algorithm for acoustic waves in inhomogeneous, absorptive media," *IEEE Trans. Ultrason., Ferroelect., Freq. Contr.*, vol. 45, no. 4, pp. 1044-1055, 1998.
- [37] Q. H. Liu, and J. Q. He, "Quasi-PML for waves in cylindrical coordinates," *Microwave Opt. Technol. Lett.*, vol. 19, no. 2, pp. 107-111, 1998.
- [38] G.-X. Fan, and Q. H. Liu, "A PML-FDTD algorithm for simulating plasma-covered cavity-backed slot antennas," *Microwave Opt. Technol. Lett.*, vol. 19, no. 4, pp. 258-262, 1998.
- [39] Q. H. Liu, and X. Y. Tang, "An iterative algorithm for nonuniform inverse fast Fourier transform (NU-IFFT)," *Electronics Letters*, vol. 34, no. 20, pp. 1913-1914, 1998.
- [40] N. Nguyen, and Q. H. Liu, "The regular Fourier matrices and nonuniform fast Fourier transforms," *SIAM J. Sci. Comput.*, vol. 21, no. 1, pp. 283-293, 1999.
- [41] Q. H. Liu, "Large-scale simulations of electromagnetic and acoustic measurements using the pseudospectral time-domain (PSTD) algorithm," *IEEE Trans. Geosci. Remote Sensing*, vol. 37, no. 2, pp. 917-926, 1999.
- [42] J. He, and Q. H. Liu, "A nonuniform cylindrical FDTD algorithm with improved PML and quasi-PML absorbing boundary conditions," *IEEE Trans. Geosci. Remote Sensing*, vol. 37, no. 2, pp. 1066-1072, 1999.
- [43] Q. H. Liu, "PML and PSTD algorithm for arbitrary lossy anisotropic media," *IEEE Microwave Guided Wave Lett.*, vol. 9, no. 2, pp. 48-50, 1999.
- [44] Q. H. Liu, and G.-X. Fan, "A frequency-dependent PSTD algorithm for general dispersive media," *IEEE Microwave Guided Wave Lett.*, vol. 9, no. 2, pp. 51-53, 1999.
- [45] Q. H. Liu, "Perfectly matched layers for elastic waves in cylindrical and spherical coordinates," *J. Acoust. Soc. Am.*, vol. 105, no. 4, pp. 2075-2084, 1999.
- [46] Q. H. Liu, and G.-X. Fan, "Simulations of GPR in dispersive media using the PSTD algorithm," *IEEE Trans. Geosci. Remote Sensing*, vol. 37, no. 5, pp. 2317-2324, 1999.
- [47] Q. H. Liu, and Z. Q. Zhang, "A nonuniform fast Hankel transform (NUFHT) algorithm," *Applied Optics*, vol. 38, no. 32, pp. 6705-6708, 1999.
- [48] Q. H. Liu, and B. K. Sinha, "Simulations of multipole sources in biaxially stressed boreholes: A 2.5-dimensional finite-difference method," *Geophysics*, vol. 65, no. 1, pp. 190-201, 2000.
- [49] X. M. Xu, and Q. H. Liu, "The conjugate-gradient nonuniform fast Fourier transform (CG-NUFFT) method for one- and two-dimensional media," *Microwave Opt. Technol. Lett.*, vol. 24, no. 6, pp. 385-389, 2000.
- [50] B. Tian, and Q. H. Liu, "Nonuniform fast cosine transform and Chebyshev PSTD algorithm," *Progress in Electromagnetics Research*, PIER 28, pp. 259-279, 2000. Abstract in *J. Electromagnet. Waves Appl.*, vol. 14, no. 6, 797-798, 2000.
- [51] G.-X. Fan, and Q. H. Liu, "An FDTD algorithm with PML for dispersive, conductive media," *IEEE Trans. Antennas Propagat.*, vol. 48, no. 5, pp. 637-646, 2000.
- [52] Z. Q. Zhang, and Q. H. Liu, "Reconstruction of axisymmetric media with an FFHT enhanced extended Born approximation," *Inverse Problems*, invited paper, vol. 16, no. 5, pp. 1281-1296, 2000.
- [53] G.-X. Fan, Q. H. Liu, and S. P. Blanchard, "3-D numerical mode-matching (NMM) method for resistivity well logging tools," *IEEE Trans. Antennas Propagat.*, vol. 48, no. 10, pp. 1544-1552, 2000.
- [54] Q. H. Liu, X. M. Xu, B. Tian, and Z. Q. Zhang, "Applications of nonuniform fast transform algorithms in numerical solutions of differential and integral equations," *IEEE Trans. Geosci. Remote Sensing*, vol. 38, pp. 1551-1560, 2000.
- [55] Q. H. Liu, Z. Q. Zhang, and X. M. Xu, "The hybrid extended Born approximation and CG-FFT method for electromagnetic induction problems," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 2, pp. 347-355, Feb. 2001.
- [56] X. M. Xu, and Q. H. Liu, "Fast spectral-domain method for acoustic scattering problems," *IEEE Trans. Ultrason., Ferroelect., Freq. Contr.*, vol. 48, no. 2, pp. 522-529, March 2001.
- [57] G.-X. Fan, and Q. H. Liu, S. A. Hutchinson, "FDTD and PSTD Simulations for plasma applications," *IEEE Trans. Plasma Sci.*, vol. 29, no. 2, pp. 341-348, 2001.

- [58] G.-X. Fan, and Q. H. Liu, "Pseudospectral time-domain algorithm applied to electromagnetic scattering from electrically large objects", *Microwave Opt. Technol. Lett.*, vol. 29, no. 2, pp. 123-125, 2001.
- [59] Y. Q. Zeng, J. He, and Q. H. Liu, "The application of the perfectly matched layer in numerical modeling of wave propagation in poroelastic media," *Geophysics*, vol. 66, no. 4, pp. 1258-1266, 2001.
- [60] Z. Q. Zhang, and Q. H. Liu, "Simulation of induction logging response using conjugate gradient method with nonuniform fast Fourier and fast Hankel transforms," *Radio Sci.*, vol. 36, no. 4, pp. 599-608, 2001.
- [61] Z. Q. Zhang, and Q. H. Liu, "The hybrid extended Born approximation and CG-FFHT method for axisymmetric media," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 4, pp. 710-717, April 2001.
- [62] G.-X. Fan, and Q. H. Liu, "The CGFFT method with a discontinuous FFT algorithm," *Microwave Opt. Technol. Lett.*, vol. 29, no. 1, pp. 47-49, 2001.
- [63] Z. Q. Zhang, and Q. H. Liu, "Three-dimensional weak-form conjugate- and biconjugate-gradient FFT methods for volume integral equations," *Microwave Opt. Technol. Lett.*, vol. 29, no. 5, pp. 350-356, 2001.
- [64] Y. Q. Zeng, and Q. H. Liu, "Acoustic detection of buried objects in 3-D fluid saturated porous media: numerical modeling," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 6, pp. 1165-1173, June 2001.
- [65] Q. H. Liu, and J. Q. He, "An efficient PSTD algorithm for cylindrical coordinates," *IEEE Trans. Antennas Propagat.*, vol. 49, no. 9, pp. 1349-1351, Sept. 2001.
- [66] Y. Q. Zeng, and Q. H. Liu, "A staggered-grid finite-difference method with perfectly matched layers for poroelastic wave equations," *J. Acoust. Soc. Am.*, vol. 109, no. 6, pp. 2571-2580, 2001.
- [67] Z. Q. Zhang, and Q. H. Liu, "Two nonlinear inverse methods for electromagnetic induction measurements," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 6, pp. 1331-1339, June 2001.
- [68] Q. H. Liu, Z. Q. Zhang, T. Wang, G. Ybarra, L. W. Nolte, J. A. Bryan, W. T. Joines, "Active microwave imaging I: 2-D forward and inverse scattering methods," *IEEE Trans. Microwave Theory Tech.*, vol. 50, no. 1, pp. 123-133, Jan. 2002.
- [69] X. M. Xu, Q. H. Liu, and Z. Q. Zhang, "The stabilized biconjugate gradient fast Fourier transform method for electromagnetic scattering," *J. Appl. Computat. Electromag. Soc.*, vol. 17, no. 1, pp. 97-103, March 2002.
- [70] G.-X. Fan, and Q. H. Liu, "Dyadic Green's functions for curved waveguides and cavities and their reformulation," *Radio Sci.*, vol. 37, no. 5, 1078, doi:10.1029/2001RS002476, 2002.
- [71] G.-X. Fan, Q. H. Liu, and J. S. Hesthaven, "Multidomain pseudospectral time-domain method for simulation of scattering from objects buried in lossy media," *IEEE Trans. Geosci. Remote Sensing*, vol. 40, no. 6, pp. 1366-1373, June 2002.
- [72] X. M. Xu, and Q. H. Liu, "The BCGS-FFT method for electromagnetic scattering from inhomogeneous objects in a planarly layered medium," *IEEE Antennas Wireless Propagat. Lett.*, vol. 1, pp. 77-80, 2002.
- [73] Z. Q. Zhang, and Q. H. Liu, "A volume adaptive integral method (VAIM) for 3D inhomogeneous objects," *IEEE Antennas Wireless Propagat. Lett.*, vol. 1, no. 6, pp. 102-105, 2002.
- [74] Q. H. Liu, "A pseudospectral frequency-domain (PSFD) method for computational electromagnetics," *IEEE Antennas Wireless Propagat. Lett.*, vol. 1, no. 6, pp. 131-134, 2002.
- [75] Z. Q. Zhang, Q. H. Liu, and X. M. Xu, "RCS computation of large inhomogeneous objects using a fast integral equation solver," *IEEE Trans. Antennas Propagat.*, vol. 51, no. 3, pp. 613-618, March 2003.
- [76] G. Zhao, and Q. H. Liu, "The 2.5-D multidomain pseudospectral time-domain algorithm," *IEEE Trans. Antennas Propagat.*, vol. 51, no. 3, pp. 619-627, March 2003.
- [77] Z. Q. Zhang, and Q. H. Liu, "Applications of the BCGS-FFT method to 3-D induction well logging problems," *IEEE Trans. Geosci. Remote Sensing*, vol. 41, no. 5, pp. 998-1004, 2003.
- [78] Q. H. Liu, and B. K. Sinha, "A 3-D cylindrical PML/FDTD method for elastic waves in fluid-filled pressurized boreholes in triaxially stressed formations," *Geophysics*, vol. 68, no. 5, pp. 1731-1743, 2003.
- [79] X. Millard, and Q. H. Liu, "A fast volume integral equation solver for electromagnetic scattering from large inhomogeneous objects in planarly layered media," *IEEE Trans. Antennas Propagat.*, vol. 51, no. 9, pp. 2393-2401, 2003.
- [80] G. Zhao, Y. Q. Zeng, and Q. H. Liu, "The 3-D multidomain pseudospectral time-domain method for wideband simulation," *IEEE Microwave Wireless Compon. Lett.*, vol. 13, no. 5, pp. 184-186, May 2003.
- [81] T. Xiao, and Q. H. Liu, "Finite difference computation of head-related transfer function for human hearing," *J. Acous. Soc. Am.*, vol. 113, no. 5, pp. 2434-2441, 2003.
- [82] I. N. Deshmukh, and Q. H. Liu, "Pseudospectral beam propagation method for optical waveguides," *IEEE Photon. Technol. Lett.*, vol. 15, no. 1, pp. 60-62, Jan. 2003.
- [83] Z. B. Tang, and Q. H. Liu, "The 2.5-D FDTD and Fourier PSTD methods and applications," *Microwave Opt. Technol. Lett.*, vol. 36, no. 6, pp. 430-436, 2003.

- [84] Z. Q. Zhang, and Q. H. Liu, C. Xiao, E. Ward, G. Ybarra, and W. T. Joines, "Microwave breast imaging: 3-D forward scattering simulation," *IEEE Trans. Biomed. Eng.*, vol. 50, no. 10, pp. 1180-1189, Oct. 2003.
- [85] G.-X. Fan, and Q. H. Liu, "A strongly well-posed PML in lossy media," *IEEE Antennas Wireless Propagat. Lett.*, vol. 2, no. 7, pp. 97-100, 2003.
- [86] G. Zhao, and Q. H. Liu, "The unconditionally stable multidomain pseudospectral time-domain method," *IEEE Microwave Wireless Compon. Lett.*, vol. 13, no. 11, pp. 475-477, 2003.
- [87] Z. Q. Zhang, and Q. H. Liu, "3-D nonlinear image reconstruction for microwave biomedical imaging," *IEEE Trans. Biomed. Eng.*, vol. 51, no. 3, pp. 544-548, 2004.
- [88] G.-X. Fan, and Q. H. Liu, "Fast Fourier transform for discontinuous functions," *IEEE Trans. Antennas Propagat.*, vol. 52, no. 2, pp. 461-465, Feb. 2004.
- [89] X. Millard, and Q. H. Liu, "Simulations of near-surface detection of objects in layered media by the BCGS-FFT method," *IEEE Trans. Geosci. Remote Sensing*, vol. 42, no. 2, pp. 327-334, 2004.
- [90] T. Xiao, and Q. H. Liu, "A staggered upwind embedded boundary method to eliminate the FDTD staircasing error," *IEEE Trans. Antennas Propagat.*, vol. 52, no. 3, pp. 730-741, March 2004.
- [91] G. Zhao, and Q. H. Liu, "The 3-D multidomain pseudospectral time-domain method for inhomogeneous conductive media," *IEEE Trans. Antennas Propagat.*, vol. 52, no. 3, pp. 742-749, March 2004.
- [92] Y. Q. Zeng, Q. H. Liu, and G. Zhao, "Multidomain pseudospectral time-domain (PSTD) method for acoustic waves in lossy media," *J. Computational Acoust.*, vol. 12, no. 3, pp. 277-299, Sept. 2004.
- [93] S. A. Wartenberg, and Q. H. Liu, "A coaxial-to-microstrip transition for multi-layer substrates," *IEEE Trans. Microwave Theory Tech.*, vol. 52, no. 2, pp. 584-588, Feb. 2004.
- [94] Q. H. Liu, and G. Zhao, "Review of PSTD Methods for transient electromagnetics," *Intl. J. Numer. Modelling: Electronic Networks, Devices and Fields*, vol. 22, no. 17, pp. 299-323, 2004.
- [95] F. Li, Q. H. Liu, and L.-P. Song, "Three-dimensional reconstruction of objects buried in layered media using Born and distorted Born iterative methods," *IEEE Geosci. Remote Sensing Lett.*, vol. 1, no. 2, pp. 107-111, 2004.
- [96] Y. Q. Zeng, and Q. H. Liu, "A multidomain PSTD method for 3D elastic wave equations," *Bulletin Seis. Soc. Am.*, vol. 94, no. 3, pp. 1002-1015, 2004.
- [97] J. Liu, and Q. H. Liu, "A spectral integral method (SIM) for periodic and nonperiodic structures," *IEEE Microwave Wireless Compon. Lett.*, vol. 14, no. 3, pp. 97-99, March 2004.
- [98] T. Xiao, and Q. H. Liu, "Enlarged cells for the conformal FDTD method to avoid the time step reduction," *IEEE Microwave Wireless Compon. Lett.*, vol. 14, pp. 551-553, 2004.
- [99] Q. H. Liu, C. Cheng, and H. Z. Massoud, "The spectral grid method: A novel fast Schrödinger-equation solver for semiconductor nanodevice simulation," *IEEE Trans. Computer Aided Design Integrated Circ. Systems*, vol. 23, no. 8, pp. 1200-1208, Aug. 2004.
- [100] L.-P. Song, and Q. H. Liu, "Fast three-dimensional electromagnetic nonlinear inversion in layered media with a novel scattering approximation," *Inverse Problems*, vol. 20, no. 6, pp. S171-194, Dec. 2004.
- [101] L.-P. Song, and Q. H. Liu, "GPR landmine imaging: 2D seismic migration and 3D inverse scattering in layered media," *Radio Science*, vol. 40, RS1S90, doi:10.1029/2004RS003087, 2004.
- [102] C. Cheng, Q. H. Liu, J. H. Lee, and H. Z. Massoud, "Spectral element method for the Schrödinger-Poisson System," *J. Computat. Electronics*, vol. 3, pp. 417-421, 2004.
- [103] L.-P. Song, Q. H. Liu, F. Li, and Z. Q. Zhang, "Reconstruction of three-dimensional objects in layered media: Theory and numerical experiments," *IEEE Trans. Antennas Propagat.*, vol. 53, no. 4, pp. 1556-1561, April 2005.
- [104] L.-P. Song, and Q. H. Liu, "A new approximation to three-dimensional electromagnetic scattering," *IEEE Geosci. Remote Sensing Lett.*, vol. 2, no. 2, pp. 238-242, April 2005.
- [105] Y. Chen, W. T. Joines, M. Chai, Q. H. Liu, and L. Carin, "Design and construction of a broadband balun for coaxial-to-planar transmission lines," *Microwave Opt. Technol. Lett.*, vol. 44, no. 6, pp. 501-504, 2005.
- [106] S. A. Wartenberg, G. Zhao, and Q. H. Liu, "Electro-Thermal Coupling of Interconnects on GaAs," *J. Electronic Materials*, vol.34, no. 3, pp. 294-298, 2005.
- [107] J.-H. Lee, and Q. H. Liu, "An efficient 3-D spectral element method for Schrödinger equation in nanodevice simulation," *IEEE Trans. Computer Aided Design Integrated Circ. Systems*, vol. 24, no. 12, pp. 1848-1858, Dec. 2005.
- [108] D. Liu, G. Kang, L. Li, Y. Chen, S. Vasudevan, W. Joines, Q. H. Liu, J. Krolik, and L. Carin, "Electromagnetic time-reversal imaging of a target in a cluttered environment," *IEEE Trans. Antennas Propagat.*, vol. 53, no. 9, pp. 3058-3066, 2005.

- [109] T. Xiao, and Q. H. Liu, "Three-dimensional unstructured-grid discontinuous Galerkin method for Maxwell's equations with well-posed perfectly matched layer," *Microwave Opt. Technol. Lett.*, vol. 46, no. 5, pp. 459-463, 2005.
- [110] L.-P. Song, C. Yu, and Q. H. Liu, "Through-wall imaging (TWI) by radar: 2D tomographic results and analyses," *IEEE Trans. Geosci. Remote Sensing*, vol. 43, no.12, pp. 2793-2798, 2005.
- [111] C. Yu, L.-P. Song, and Q. H. Liu, "Inversion of multi-frequency experimental data for imaging complex objects by a hybrid DTA-CSI method," *Inverse Prob.*, Invited Paper, vol. 21, no. 6, S165-S178, Dec. 2005.
- [112] L. P. Song, E. Simsek, and Q. H. Liu, "A fast 2-D volume integral equation solver for scattering from inhomogeneous objects in layered media," *Microwave Opt. Technol. Lett.*, vol. 47, no. 2, pp. 128-134, 2005.
- [113] E. Simsek, Q. H. Liu, and B. Wei, "Singularity subtraction for evaluation of Green's functions for multilayer media," *IEEE Trans. Microwave Theory Tech.*, vol. 54, no. 1, pp. 216-225, Jan. 2006.
- [114] J.-H. Lee, T. Xiao, and Q.H. Liu, "A 3-D spectral element method using mixed-order curl conforming vector basis functions for electromagnetic fields," *IEEE Trans. Microwave Theory Tech.*, vol. 54, no. 1, pp. 437-444, Jan. 2006.
- [115] J. Song, Q. H. Liu, K. Kim, and W. R. Scott, Jr., "High-resolution 3-D radar imaging through nonuniform fast Fourier transform (NUFFT)," *Comm. Computat. Phys.*, vol. 1, no. 1, pp. 176-191, 2006.
- [116] M. Chai, T. Xiao, and Q. H. Liu, "A conformal method to eliminate the ADI-FDTD staircasing errors," *IEEE Trans. Electromag. Compatibility*, vol. 48, no. 2, pp. 273-281, 2006.
- [117] Y. Liu, J.-H. Lee, T. Xiao, and Q. H. Liu, "A spectral element time-domain solution of Maxwell's equations," *Microwave Opt. Technol. Lett.*, vol. 48, no. 4, pp. 673-680, 2006.
- [118] E. Simsek, J. Liu, and Q. H. Liu, "A spectral integral method (SIM) for layered media," *IEEE Trans. Antennas Propagat.*, vol. 54, no. 6, pp. 1742-1749, June 2006.
- [119] J. Song, Q. H. Liu, P. Torrione, and L. Collins, "2-D and 3-D NUFFT migration method for landmine detection using ground-penetrating radar," *IEEE Trans. Geosci. Remote Sensing*, vol. 44, no. 6, pp. 1462-1469, June 2006.
- [120] K. H. Lim, J.-H. Lee, G. Ye, and Q. H. Liu, "An efficient forward solver in electrical impedance tomography by spectral element method," *IEEE Trans. Med. Imaging*, vol. 25, no. 8, pp. 1044-1051, August 2006.
- [121] Y. Chen, Z. Xie, W. T. Joines, Q. H. Liu, and L. Carin, "Double-sided Exponentially Tapered GPR Antenna and Its Transmission Line Feed Structure," *IEEE Trans. Antennas Propagat.*, vol. 54, no. 9, pp. 2615-2623, Sept. 2006.
- [122] B. K. Sinha, E. Simsek, Q. H. Liu, "Elastic-wave propagation in deviated wells in anisotropic formations," *Geophysics*, vol. 71, no. 6, pp. D191-202, 2006.
- [123] E. Simsek, J. Liu, and Q. H. Liu, "A spectral integral method and hybrid SIM/FEM for layered media," *IEEE Trans. Microwave Theory Tech.*, vol. 54, no. 11, pp. 3878-3884, Nov. 2006.
- [124] J. Song, and Q. H. Liu, "Improving non-Cartesian MRI reconstruction through discontinuity subtraction," *Intl. J. Biomed. Imaging*, vol. 2006, Article ID 87092, 2006. doi: 10.1155/IJBI/2006/87092.
- [125] B. Wei, E. Simsek, Q. H. Liu, "Improved diagonal tensor approximation (DTA) and hybrid DTA/BCGS-FFT method for accurate simulation of 3-D inhomogeneous objects in layered media," *Waves in Random and Complex Media*, vol. 17, no. 1, pp. 55-66, Feb. 2007.
- [126] B. Wei, E. Simsek, C. Yu, and Q. H. Liu, "Fast three-dimensional electromagnetic nonlinear inversion in layered media by a hybrid diagonal tensor approximation stabilized biconjugate gradient fast Fourier transform method," *Waves in Random and Complex Media*, vol. 17, no. 2, pp. 129-147, May 2007.
- [127] M. Chai, T. Xiao, G. Zhao, and Q. H. Liu, "A Hybrid PSTD/ADI-CFDTD Method for Mixed-Scale Electromagnetic Problems," *IEEE Trans. Antennas Propagat.*, vol. 55, no. 5, pp. 1398-1406, May 2007.
- [128] J.-H. Lee, and Q. H. Liu, "A 3-D spectral element time-domain method for electromagnetic simulation," *IEEE Trans. Microwave Theory Tech.*, vol. 55, no. 5, pp. 983-991, May 2007.
- [129] J. Liu, and Q. H. Liu, "A novel radiation boundary condition for finite-element method," *Microwave Opt. Technol. Lett.*, vol. 49, no. 8, pp. 1995-2002, 2007.
- [130] C. Cheng, J.-H. Lee, K. H. Lim, H. Z. Massoud, and Q. H. Liu, "3D quantum transport solver based on the perfectly matched layer and spectral element methods for the simulation of semiconductor nanodevices," *J. Computat. Phys.*, doi: 10.1016/j.jcp.2007.07.028, vol. 227, pp. 455-471, 2007.
- [131] K. H. Lim, G. Shi, K. McCarter, R. George, Jr. G. A. Ybarra, W. T. Joines, S. Wartenberg, and Q. H. Liu, "2D EIT for biomedical imaging: design, measurement, simulation, and image reconstruction," *Microwave Opt. Technol. Lett.*, vol. 49, no. 12, pp. 2989-2998, 2007.

- [132] J. Song, Q. H. Liu, G. A. Johnson, and C. T. Badea, "Sparseness prior based iterative image reconstruction for retrospectively gated cardiac micro-CT," *Med. Phys.*, vol. 34, no. 11, pp. 4476-4483, 2007.
- [133] K. H. Lim, J.-H. Lee, and Q. H. Liu, "Thermoacoustic Tomography Forward Modeling with the Spectral Element Method," *Medical Physics*, vol. 35, no. 1, pp. 4-12, Jan. 2008.
- [134] B. J. Wei, G. J. Zhang, Q. H. Liu, "Recursive algorithm and accurate computation of dyadic Green's functions for stratified uniaxial anisotropic media," *Science in China, F - Information Sciences*, vol. 51, no. 1, pp. 63-80, 2008.
- [135] T. Xiao, and Q. H. Liu, "A 3-D enlarged cell technique (ECT) for the conformal FDTD method," *IEEE Trans. Antennas Propagat.*, vol. 56, no. 3, pp. 765-773, March 2008.
- [136] C. Yu, M. Yuan, J. Stang, E. Bresslour, R. T. George, G. A. Ybarra, W. T. Joines, and Q. H. Liu, "Active microwave imaging II: 3-D system prototype and image reconstruction from experimental data," *IEEE Trans. Microwave Theory Tech.*, vol. 56, no. 4, pp. 991-1000, 2008.
- [137] Y. Huang, W.-Y. Yin, and Q. H. Liu, "Performance prediction of carbon nanotube bundle dipole antennas," *IEEE Trans. Nanotechnol.*, vol. 7, no. 3, pp. 331-337, March 2008.
- [138] C. Cheng, J.-H. Lee, H. Z. Massoud, and Q. H. Liu, "3-D self-consistent Schrödinger-Poisson solver: the spectral element method," *J. Computat. Electronics*, vol. 7, no. 3, pp. 337-341, Sept. 2008.
- [139] Y. Liu, Z. Nie, and Q. H. Liu, "Reducing the number of elements in a linear antenna array by the matrix pencil method," *IEEE Trans. Antennas Propag.*, vol. 56, no. 9, pp. 2955-2962, Sept. 2008.
- [140] G. P. Chen, Z. Q. Zhao, Z. P. Nie, Q. H. Liu, "The prototype of microwave-induced thermo-acoustic tomography imaging by time reversal mirror," *J. Electromag. Waves Appl.*, vol. 22, no. 11, 1565-1574, 2008.
- [141] Y. Liu, Z. Nie, and Q. H. Liu, "DIFFT: A fast and accurate algorithm for Fourier transform integrals of discontinuous functions," *IEEE Microwave Wireless Compon. Lett.*, vol. 18, no. 11, pp. 716-718, 2008.
- [142] G. P. Chen, Z. Q. Zhao, Z. P. Nie, Q. H. Liu, "A computational study of time reversal mirror technique for microwave-induced thermo-acoustic tomography," *J. Electromag. Waves Appl.*, vol. 22, no. 12, 2191-2204, 2008.
- [143] G. Ye, K. H. Lim, R. George, Jr., G. Ybarra, W. T. Joines, and Q. H. Liu, "3-D EIT for Breast Cancer Imaging: System, Measurements, and Reconstruction," *Microwave Opt. Technol. Lett.*, vol. 50, no. 12, pp. 3261-3271, 2008.
- [144] M. Luo, Q. H. Liu, and Z. Li, "Two-dimensional Green's function tensor and projected local density of state for TM and TE modes in dispersive and anisotropic photonic crystals," *Waves in Random and Complex Media*, vol. 19, no. 1, pp. 28-38, 2009.
- [145] Q. H. Liu, Y. Lin, J. Liu, J.-H. Lee, and E. Simsek, "A 3-D spectral integral method (SIM) for surface integral equations," *IEEE Microwave Wireless Compon. Lett.*, vol. 19, no. 2, pp. 62-64, Feb. 2009.
- [146] M. Luo, Q. H. Liu, and Z. Li, "Spectral element method for band structures of two-dimensional anisotropic photonic crystals," *Phys. Rev. E*, vol. 79, no. 2, 026705, 2009.
- [147] C. Yu, M. Yuan, and Q. H. Liu, "Reconstruction of 3-D objects with multi-frequency experimental data using the fast DBIM-BCGS method," *Inverse Prob.*, vol. 25, 024007, doi:10.1088/0266-5611/25/2/024007, 2009.
- [148] W.-J. Zheng, Z.-Q. Zhao, Z.-P. Nie, and Q. H. Liu, "Evaluation of TRM in the complex through wall environment," *Progress Electromag. Res.*, PIER 90, pp. 235-254, 2009.
- [149] S. Y. Yang, Q. H. Liu, J. W. Lu, S. L. Ho, G. Z. Ni, P. H. Ni, S. M. Xiong, "Application of support vector machines to accelerate the solution speed of metaheuristic algorithms," *IEEE Trans. Magnetics*, vol. 45, no. 3, pp. 1502-1505, 2009.
- [150] J. Wang, W. Y. Yin, Q. H. Liu, "FDTD (2,4)-compatible conformal technique for treatment of dielectric surfaces," *Electronic Lett.*, vol. 45, no. 3, pp. 146-147, 2009.
- [151] Y. Liu, Q. H. Liu, and Z. Nie, "A new efficient FDTD time-to-frequency-domain conversion algorithm," *Progress Electromag. Res.*, PIER 92, pp. 33-46, 2009.
- [152] S.-N. Pu, W.-Y. Yin, J.-F. Mao, and Q. H. Liu, "Crosstalk prediction of single- and double-walled carbon-nanotube (SWCNT/DWCNT) bundle interconnects," *IEEE Trans. Electronic Dev.*, vol. 56, no. 4, pp. 560-568, April 2009.
- [153] Q. F. Liu, W. Y. Yin, M. F. Xue, J. F. Mao, and Q. H. Liu, "Shielding characterization of metallic enclosures with multiple slots and a thin wire antenna loaded: multiple oblique EMP incidences with arbitrary polarizations," *IEEE Trans. Electronmag. Compatibility*, vol. 51, no. 2, pp. 284-292, May 2009.

- [154] J. Song, Y. Liu, S. L. Gewalt, G. Cofer, G. A. Johnson, and Q. H. Liu, "General least square NUFFT methods applied to 2D and 3D radially encoded MR image reconstruction," *IEEE Trans. Biomed. Eng.*, vol. 56, no. 4, pp. 1134-1153, 2009.
- [155] G. P. Chen, Z. Q. Zhao, W. J. Zheng, Z. P. Nie, Q. H. Liu, "Application of time reversal mirror technique in microwave-induced thermo-acoustic tomography system," *Sci. China Series E*, vol. 52, no. 7, pp. 2087-2095, 2009.
- [156] M. Luo, and Q. H. Liu, "Accurate determination of band structures of 2D dispersive anisotropic photonic crystals by the spectral element method," *J. Opt. Soc. Am. A*, vol. 26, no. 7, pp. 1598-1605, 2009.
- [157] Y. Zhao, G. Dai, Y. Tang, and Q. H. Liu, "Symplectic discretization for spectral element solution of Maxwell's equations," *J. Phys. A: Math. Theor.*, vol. 42, 325203, 2009.
- [158] J. Chen, and Q. H. Liu, "A non-spurious vector spectral element method for Maxwell's equations," *Progress Electromag. Res.*, PIER 96, pp. 205-215, 2009.
- [159] Y. B. Shi, W.-Y. Yin, F.-F. Mao, P. G. Liu, Q. H. Liu, "Transient electrothermal analysis of multilevel interconnects in the presence of ESD pulses using the nonlinear time-domain finite-element method," *IEEE Trans. Electromagn. Compatibility*, vol. 51, no. 3, pp. 774-783, Aug. 2009.
- [160] J. H. Lee, J. Chen, and Q. H. Liu, "A 3-D discontinuous spectral element time-domain method for Maxwell's equations," *IEEE Trans. Antennas Propagat.*, vol. 57, no. 9, pp. 2666-2674, Sept. 2009.
- [161] S. Yang, Y. Liu, Q. H. Liu, "Combined strategies based on matrix pencil method and Tabu search algorithm to minimize elements of non-uniform antenna array," *Progress Electromag. Res. B*, vol. 18, pp. 259-277, 2009.
- [162] J. Chen, J.-H. Lee, and Q. H. Liu, "A high precision integration scheme for the spectral-element time-domain method in electromagnetic simulation," *IEEE Trans. Antennas Propagat.*, vol. 57, no. 10, pp. 3223-3231, Oct. 2009.
- [163] J. Yu, M. Yuan, and Q. H. Liu, "A wideband half oval patch antenna for breast imaging," *Progress in Electromag. Res.*, PIER 98, pp. 1-13, 2009.
- [164] M. Luo, and Q. H. Liu, "Spectral element method for band structures of three-dimensional anisotropic photonic crystals," *Phys. Rev. E*, vol. 80, 056702, 2009.
- [165] Y. Lin, J.-H. Lee, J. Liu, M. Chai, J. A. Mix, and Q. H. Liu, "A hybrid SIM-SEM method for 3-D electromagnetic scattering problems," *IEEE Trans. Antennas Propagat.*, vol. 57, no. 11, pp. 3655-3663, Nov. 2009.
- [166] Q. F. Liu, W. Y. Yin, M. Tang, and Q. H. Liu, "Time-domain investigation on cable-induced transient coupling into metallic enclosures," *IEEE Trans. Electronmag. Compatibility*, vol. 51, no. 4, pp. 953-962, Nov. 2009.
- [167] H.-S. Leong, J. Guo, R. G. Lindquist, and Q. H. Liu, "Surface plasmon resonance in nanostructured metal films under the Kretschmann configuration," *J. Appl. Phys.*, vol. 106, 124314, 2009.
- [168] Z. Ren, W.-Y. Yin, Y.-B. Shi, and Q. H. Liu, "Thermal accumulation effects on the transient temperature responses in LDMOSFETs under the impact of a periodic electromagnetic pulse (EMP)," *IEEE Trans. Electron Dev.*, vol. 57, no. 1, pp. 345-352, Jan. 2010.
- [169] J. Chen, Q. H. Liu, M. Chai, and J. A. Mix, "A non-spurious 3-D vector discontinuous Galerkin finite-element time-domain method," *IEEE Microwave Wireless Compon. Lett.*, vol. 20, no. 1, pp. 1-3, Jan. 2010.
- [170] C. Yu, M. Yuan, Y. Zhang, J. Stang, R. T. George, G. A. Ybarra, W. T. Joines, and Q. H. Liu, "Microwave imaging in layered media: 3-D image reconstruction from experimental data," *IEEE Trans. Antennas Propagat.*, vol. 58, no. 2, pp. 440-448, Feb. 2010.
- [171] Y. Liu, Q. H. Liu, and Z. Nie, "Reducing the number of elements in the synthesis of shaped-beam patterns by the forward-backward matrix pencil method," *IEEE Trans. Antennas Propagat.*, vol. 58, no. 2, pp. 604-608, Feb. 2010.
- [172] M. Luo, Q. H. Liu, and J. Guo, "A spectral element method calculation of extraordinary light transmission through periodic subwavelength slits," *J. Opt. Soc. Am. B*, vol. 27, no. 3, pp. 560-566, 2010.
- [173] Y.-Q. Huang, Y.-H. Liu, Q. H. Liu, and J.-Z. Zhang, "Improved 3-D GPR detection by NUFFT combined with MPD method," *Progress in Electromagnetics Res.*, PIER 103, pp. 185-199, 2010.
- [174] X. Rui, J. Hu, and Q. H. Liu, "Fast inhomogeneous plane wave algorithm for scattering from PEC body of revolution," *Microwave Opt. Technol. Lett.*, vol. 52, no. 8, 1915-1922, 2010.
- [175] Y. He, L. Li, C. H. Liang, Q. H. Liu, L. Li and H. B. Wen, "Leafy EBG structures for ultra-wideband SSN suppression in power/ground plane pairs," *IEE Electron. Lett.*, vol. 46, no. 11, pp. 768-769, May 2010.

- [176] X. Rui, J. Hu, and Q. H. Liu, "Fast inhomogeneous plane wave algorithm for homogeneous dielectric body of revolution," *Commun. Comput. Phys.*, vol. 8, no. 4, pp. 917-932, 2010.
- [177] X. Rui, J. Hu, and Q. H. Liu, "Higher order finite element method for inhomogeneous axisymmetric resonators," *Progress in Electromagnetics Res. B*, vol. 21, pp. 189-201, 2010.
- [178] M. Luo, Q. H. Liu, "Three-dimensional dispersive metallic photonic crystals with a band gap and a high cutoff frequency," *J. Opt. Soc. Am. A*, vol. 27, no. 8, pp. 1878-1884, 2010.
- [179] Y. He, L. Li, H. Q. Zhai, X. J. Dang, C. H. Liang, and Q. H. Liu, "Sierpinski space-filling curves and their application in high-speed circuits for ultrawideband SSN suppression," *IEEE Antennas Wireless Propagat. Lett.*, vol. 9, pp. 568-571, 2010.
- [180] Y. Liu, Z.-P. Nie, and Q. H. Liu, "A new method for the synthesis of non-uniform linear arrays with shaped power patterns," *Progress in Electromagnetics Res.*, PIER 107, pp. 349-363, 2010.
- [181] Y. He, L. Li, C. H. Liang, and Q. H. Liu, "EBG structures with fractal topologies for ultra-wideband ground bounce noise suppression," *J. Electromagn. Waves Appl.*, vol. 24, no. 10, pp. 1365-1374, 2010.
- [182] X. Rui, J. Hu, and Q. H. Liu, "Fast inhomogeneous plane wave algorithm for analysis of composite bodies of revolution," *Progress in Electromagnetics Res.*, PIER 108, pp. 235-247, 2010.
- [183] F. Z. Kong, W. Y. Yin, J. F. Mao, and Q. H. Liu, "Electro-thermo-mechanical characterizations of various wire bonding interconnects illuminated by an electromagnetic pulse," *IEEE Trans. Adv. Packaging*, vol. 33, no. 3, pp. 729-737, Aug. 2010.
- [184] J. Wang, W.-Y. Yin, P.-G. Liu, Q. H. Liu, "High-order interface treatment techniques for modeling curved dielectric objects," *IEEE Trans. Antennas Propagat.*, vol. 58, no. 9, pp. 2946-2953, Sept. 2010.
- [185] C.-H. Zhu, Q. H. Liu, Y. Shen, and L. Liu, "A high accuracy conformal method for evaluating the discontinuous Fourier transform," *Progress in Electromagnetics Res.*, PIER 109, 425-440, 2010.
- [186] Y. He, L. L. H. Q. Zhai, X. J. Dang, C. H. Liang, Q. H. Liu, "Sierpinski space-filling curves and their application in high-speed circuits for ultrawideband SSN suppression," *IEEE Antennas Wireless Propag. Lett.*, vol.9, pp. 568-571, 2010.
- [187] B. Zhu, J. Chen, W. Zhong, and Q. H. Liu, "A Hybrid FETD-FDTD Method with Nonconforming Meshes," *Commun. Comput. Phys.*, vol. 9, no. 3, pp. 828-842, 2011. doi: 10.4208 /cicp.230909.140410s.
- [188] J. Chen, B. Zhu, W. Zhong, and Q. H. Liu, "A semi-analytical spectral element method for the analysis of 3D layered structures," *IEEE Trans. Microwave Theory Tech.*, vol. 59, no. 1, pp. 1-8, 2011.
- [189] Y. H. Liu, Z. P. Nie, Z. Q. Zhao, and Q. H. Liu, "Generalization of iterative Fourier interpolation algorithms for single frequency estimation," *Digital Signal Processing*, vol. 21, no. 1, pp. 141-149, 2011.
- [190] Y. Huang, J. Zhang, and Q. H. Liu, "Three-dimensional GPR ray tracing based on wavefront expansion with irregular cells," *IEEE Trans. Geosci. Remote Sensing*, vol. 49, no. 2, pp. 679-687, 2011.
- [191] M. Luo, and Q. H. Liu, "Extraordinary transmission of a thick film with a periodic structure consisting of strongly dispersive materials," *J. Opt. Soc. Am. B*, vol. 28, no. 4, pp. 629-636, 2011.
- [192] M. Yuan, and Q. H. Liu, "The diagonal tensor approximation (DTA) for objects in a non-canonical inhomogeneous background," *Progress in Electromagnetics Res.*, PIER 112, pp. 1-21, 2011.
- [193] J. Zhang, Y. Huang, L.-P. Song, and Q. H. Liu, "Fast and accurate 3-D ray tracing using bilinear travelttime interpolation and the wave front group marching," *Geophys. J. Int.*, vol. 184, pp. 1327-1340, 2011.
- [194] Y. He, C.-H. Liang, and Q. H. Liu, "Novel array EBG structures for ultrawideband simultaneous switching noise suppression," *IEEE Antennas Wireless Propagat. Lett.*, vol. 10, pp. 588-591, 2011.
- [195] L. Tobon, J. Chen, and Q. H. Liu, "Spurious solutions in mixed finite element method for Maxwell's equations: Dispersion analysis and new basis functions," *J. Computat. Phys.*, vol. 30, 7300-7310, 2011.
- [196] Y.-H. Liu, Q. H. Liu, Z.-P. Nie, and Z.-Q. Zhao, "Discontinuous fast Fourier transform with triangle mesh for two-dimensional discontinuous functions," *J. Electromag. Waves Appl.*, vol. 25, no. 7, pp. 1045-1057, 2011.
- [197] X. Zhu, Z. Zhao, W. Yang, Y. Zhang, Z.-P. Nie, and Q. H. Liu, "Iterative time-reversal mirror method for imaging the buried object beneath rough ground surface," *Progress in Electromagnetics Research*, PIER 117, pp. 19-33, 2011.
- [198] K. Yang, Z. Zhao, Z.-P. Nie, J. Ouyang, and Q. H. Liu, "Synthesis of conformal phased arrays with embedded element pattern decomposition," *IEEE Trans. Antennas Propag.*, vol. 59, no. 8, 2882-2888, Aug. 2011.
- [199] C. H. Zhu, Q. H. Liu, Y. H. Liu, Y. Shen, and L. Liu, "An accurate conformal Fourier transform method for 2D discontinuous functions," *Prog. in Electromag. Res.*, vol. 120, pp. 165-179, 2011.
- [200] M. Luo, and Q. H. Liu, "Enhancement of second-harmonic generation in an air-bridge photonic crystal slab: simulation by spectral element method," *J. Opt. Soc. Am. B*, vol. 28, no. 12, pp. 2879-2887,

- 2011.
- [201] C. H. Zhu, Q. H. Liu, Y. Shen, and L. Liu, "An analytical convolution method combined with the conformal Fourier transform for solving volume integral equations," *IEEE Antennas Wireless Propagat. Lett.*, vol. 10, pp. 1267-1269, 2011.
 - [202] J. Chen, L. Tobon, M. Chai, and J. A. Mix, and Q. H. Liu, "Efficient implicit-explicit time stepping scheme with domain decomposition for multiscale modeling of layered structures," *IEEE Trans. Compon. Packag. Manufact. Technol.*, vol. 1, no. 9, pp. 1438-1446, Sept. 2011.
 - [203] L. Wang, M. Yuan, T. Xiao, W. T. Joines, and Q. H. Liu, "Broadband electromagnetic radiation modulated by dual memristors," *IEEE Antennas Wireless Propagat. Lett.*, vol. 10, pp. 623-626, 2011.
 - [204] L. Wang, M. Yuan, and Q. H. Liu, "A dual-band printed electrically small antenna covered by two capacitive split-ring resonators," *IEEE Antennas Wireless Propagat. Lett.*, vol. 10, pp. 824-826, 2011.
 - [205] Z. Y. He, Z. Q. Zhao, Z. P. Nie, P. Tang, J. Wang, and Q. H. Liu, "Method of solving ambiguity for sparse array via power estimation based on MUSIC algorithm," *Signal Processing*, vol. 92, no. 2, pp. 542-546, 2012.
 - [206] Z. Liu, Q. H. Liu, C. H. Zhu, and J. Y. Yang, "A fast inverse polynomial reconstruction method based on conformal Fourier transformation," *Prog. Electromagnet. Res.*, vol. 122, pp. 119-136, 2012.
 - [207] J. Wu, Z. Li, Y. Huang, Q. H. Liu, and J. Yang, "Processing one-stationary bistatic SAR data using inverse scaled Fourier transform," *Prog. Electromag. Res.*, vol. 129, pp. 143-159, 2012.
 - [208] Z. Y. He, Z. Q. Zhao, Z. P. Nie, P. Ma, and Q. H. Liu, "Resolving manifold ambiguities for sparse array using planar substrates," *IEEE Trans. Antennas Propagat.*, vol. 60, no. 5, pp. 2558-2662, 2012.
 - [209] B. Zhu, J. Chen, W. Zhong, and Q. H. Liu, "Analysis of photonic crystals using the hybrid finite-element/finite-difference time domain technique based on the discontinuous Galerkin method," *Intl. J. Numer. Methods Eng.*, vol. 92, no. 5, pp. 495-506, 2012.
 - [210] B. Zhu, J. Chen, W. Zhong, and Q. H. Liu, "Hybrid finite-element/finite-difference method with an implicit-explicit time-stepping scheme for Maxwell's equations," *Intl. J. Numer. Modelling-Electronic Networks Devices and Fields*, vol. 25, no. 5-6, Special Issue, pp. 607-620, DOI: 10.1002 / jnm.1853, 2012.
 - [211] K. Yang, Z. Zhao, J. Ouyang, Z. Nie, Q. H. Liu, "Optimisation method on conformal array element positions for low sidelobe pattern synthesis," *IET Microwaves Antennas Propagat.*, vol. 6, no. 6, pp. 646-652, DOI: 10.1049 / iet-map.2011.0330, 2012.
 - [212] K. Yang, Z. Zhao, and Q. H. Liu, "An iterative FFT based flat-top footprint pattern synthesis method with planar array," *J. Electromag. Waves Appl.*, vol. 26, pp. 1956-1966, 2012.
 - [213] J.-G. Wang, Z.-Q. Zhao, J. Song, and Q. H. Liu, "Reconstruction of microwave absorption properties in heterogeneous tissue for microwave-induced thermo-acoustic tomography," *Prog. Electromag. Research*, PIER vol. 130, pp. 225-240, DOI: 10.2528 / PIER12062704, 2012.
 - [214] K. D. Xu, Y. H. Zhang, Y. Fan, W. T. Joines, and Q. H. Liu, "Novel circular dual-mode filter with both capacitive and inductive source-load coupling for multiple transmission zeros," *J. Electromag. Waves Appl.*, vol. 26, no. 13, pp. 1675-1684, 2012.
 - [215] Z. Liu, Q. H. Liu, C. H. Zhu, and J. Y. Yang, "A fast inverse polynomial reconstruction method based on conformal Fourier transformation," *Prog. Electromag. Research*, PIER vol. 122, pp. 119-136, 2012.
 - [216] J. Wu, Z. Li, Y. Huang, Q. H. Liu, and J. Yang, "Processing one-stationary bistatic SAR data using inverse scaled Fourier transform," *Prog. Electromag. Research*, PIER vol. 129, pp. 143-159, 2012.
 - [217] Z. Zhao, J. Song, X. Zhu, J. Wang, J. Wu, Y. Liu, Z.-P. Nie, and Q. H. Liu, "System development of microwave induced thermo-acoustic tomography and experiments on breast tumor," *Prog. Electromag. Research*, vol. 134, 323-336, 2013.
 - [218] J. Wu, Z. Zhao, Z. Nie, Q. H. Liu, "A broadband unidirectional antenna based on closely spaced loading method," *IEEE. Trans. Antennas Propagat.*, vol. 61, no. 1, 109-116, DOI: 10.1109/TAP.2012.2216492, Jan. 2013.
 - [219] J. Song, Z. Zhao, J. G. Wang, Z. Nie, and Q. H. Liu, "An integrated simulation approach and experimental research on microwave induced thermo-acoustic tomography system," *Progress in Electromagnetic Res.*, PIER-140, 385-400, DOI: 10.2528 / PIER13041704, 2013.
 - [220] K. Yang, Z. Zhao, and Q. H. Liu, "Robust adaptive beamforming against array calibration errors," *Progress in Electromagnetic Res.*, PIER-140, 341-351, DOI: 10.2528 / PIER13042203, 2013.
 - [221] Y. Zhang, M. Yuan, and Q. H. Liu, "Ultra wide band response of an electromagnetic wave shield based on a diode grid," *Progress in Electromagnetic Res.*, PIER-141, 591-605, DOI: 10.2528 / PIER13053004, 2013.

- [222] J. Zhu, Q. H. Liu, and T. Lin, "Manipulating light absorption of graphene using plasmonic nanoparticles," *Nanoscale*, vol. 5, no. 17, 7785-7789, DOI: 10.1039 / c3nr02660d, 2013.
- [223] R. Pierri, J.-C. Bolomey, Q. H. Liu, "Inverse Scattering and Microwave Tomography in Safety, Security, and Health," Special Issue, *Int. J. Antennas Propagat.*, Article Number: 589598, DOI: 10.1155 / 2013/589598, 2013.
- [224] K. Xu, Y. Zhang, D. Li, Q. H. Liu, "Novel design of a compact triple-band bandpass filter using short stub-loaded SIRS and embedded SIRS structure," *Progress in Electromagnetic Res.*, PIER-142, 309-320, DOI: 10.2528 / PIER13080507, 2013.
- [225] J. Zheng, T. Su, and Q. H. Liu, "Fast parameter estimation algorithm for cubic phase signal based on quantifying effects of Doppler frequency shift," *Progress in Electromagnetic Res.*, PIER-142, 57-74, DOI: 10.2528 / PIER13061008, 2013.
- [226] Q. H. Liu, L. Jiang, and W. C. Chew, *Large-Scale Electromagnetic Computation for Modeling and Applications*, Ed., "Scanning the issue," Special Issue, *Proc. IEEE*, vol. 101, no. 2, pp. 242-253, Feb. 2013.
- [227] J. Chen, and Q. H. Liu, "Discontinuous Galerkin time-domain methods for multiscale electromagnetic simulations: A review," invited review paper, *Proc. IEEE*, vol. 101, no. 2, pp. 242-253, Feb. 2013.
- [228] M. Luo, Y. Lin, and Q. H. Liu, "Spectral methods and domain decomposition for nanophotonic applications," invited paper, *Proc. IEEE*, vol. 101, no. 2, pp. 473-483, Feb. 2013.
- [229] G. Chen, X. Wang, J. Wang, Z. Zhao, Z.-P. Nie, and Q. H. Liu, "TR adjoint imaging method for mitat," *Prog. Electromag. Res. B*, vol. 46, 41-57, 2013.
- [230] K. Yang, Z. Zhao, and Q. H. Liu, "Fast pencil beam pattern synthesis of large unequally spaced antenna arrays," *IEEE Trans. Antennas Propagat.*, vol. 61, no. 2, 627-634, DOI: 10.1109 / TAP.2012.2220319, Feb. 2013.
- [231] X. Zhu, Z. Zhao, J. Wang, Z. Nie, and Q. H. Liu, "Microwave-Induced Thermal Acoustic Tomography for Breast Tumor Based on Compressive Sensing," *IEEE Trans. Biomed. Eng.*, vol. 60, no. 5, 1298-1307, DOI: 10.1109 / TBME.2012.2233737, May 2013.
- [232] K. Xu, Y. H. Zhang, Y. Yang, W. T. Joines, Q. H. Liu, and Y. Fan, "A tri-mode bandpass filter using capacitive and inductive source-load coupling," *Microwave J.*, vol. 56, no. 5, 178-188, May 2013.
- [233] J. Chen, L. Tobon, and Q. H. Liu, "Locally implicit discontinuous Galerkin finite element method for transient analysis of 3D layered structures with electrically small details," *Microwave Opt. Technol. Lett.*, vol. 55, no. 8, 1912-1916, DOI: 10.1002 / mop.27673, Aug. 2013.
- [234] K. Xu, Y. H. Zhang, W. T. Joines, and Q. H. Liu, "Tri-Band bandpass filter using shorted stub-loaded dual-mode resonators," *Microwave J.*, vol. 56, no. 9, 1016-1020, Sept. 2013.
- [235] J. Liu, Z. Zhao, Z. He, Z. Nie, and Q. H. Liu, "Resolving manifold ambiguities for direction-of-arrival estimation of sparse array using semi-circular substrates," *IET Microwaves Antennas Propagat.*, vol. 7, 1016-1020, DOI: 10.1049 / iet-map.2012.0417, Sept. 2013.
- [236] T. Tan, and Q. H. Liu, "Unconditionally stable ADI/Crank-Nicolson implementation and lossy split error revisited," *IEEE Trans. Antennas Propagat.*, vol. 61, 5627-5636, DOI: 10.1109 / TAP.2013.2278857, Nov. 2013.
- [237] J. Li, Z. He, and Q. H. Liu, "Higher-order statistics correlation stacking for DC electrical data in the wavelet domain," *J. Appl. Geophysics*, vol. 99, pp. 51-59, Dec. 2013.
- [238] J. Wu, Z. Li, Y. Huang, and Q. H. Liu, "Focusing Bistatic Forward-Looking SAR With Stationary Transmitter Based on Keystone Transform and Nonlinear Chirp Scaling," *IEEE Geosci. Remote Sensing Lett.*, vol. 11, no. 1, pp. 148-152, Jan. 2014.
- [239] J. Wu, Z. Zhao, Z. Nie, and Q. H. Liu, "Bandwidth Enhancement of a Planar Printed Quasi-Yagi Antenna With Size Reduction," *IEEE Trans. Antennas Propagat.*, vol. 62, no. 1, pp. 463-467, Jan. 2014.
- [240] J. Wu, Z. Li, Y. Huang, and Q. H. Liu, "Omega-K Imaging Algorithm for One-Stationary Bistatic SAR," *IEEE Trans. Aerospace Electron. Syst.*, vol. 50, no. 1, pp. 33-52, Jan. 2014.
- [241] Z. Li, T. Jin, J. Wu, and Q. H. Liu, "Azimuth Stacking Algorithm for Synthetic Aperture Radar Imaging," *Progress in Electromagnetics Research*, PIER 144, pp. 103-114, 2014.
- [242] Y. Liu, and Q. H. Liu, "Combining triangle Gaussian integration and modified NUFFT for evaluating two-dimensional. Fourier transform integrals," *AEU-Intl. J. Electronics Comm.*, vol. 68, no. 3, pp. 254-259, 2014
- [243] J. Liu, Z. Zhao, K. Yang, and Q. H. Liu, "A Hybrid Optimization for Pattern Synthesis of Large Antenna Arrays," *Progress in Electromagnetics Research*, PIER 145, pp. 81-91, 2014.

- [244] J. Wu, Z. Zhao, Z. Nie, and Q. H. Liu, "A Printed UWB Vivaldi Antenna Using Stepped Connection Structure Between Slotline and Tapered Patches," *IEEE Antennas Wireless Propagat. Lett.*, vol. 13, pp. 698-701, 2014.
- [245] Y. Liu, Q. H. Liu, and Z. Nie, "Reducing the Number of Elements in Multiple-Pattern Linear Arrays by the Extended Matrix Pencil Methods," *IEEE Trans. Antennas Propagat.*, vol. 62, no. 2, pp. 652-660, Feb. 2014.
- [246] K. Yang, Z. Zhao, J. Liu, and Q. H. Liu, "Robust adaptive beamforming using an iterative FFT algorithm," *Signal Processing*, vol. 96, pp. 253-260, Part B, March 2014.
- [247] K.-D. Xu, Y.-H. Zhang, Y. Fan, and Q. H. Liu, "Planar dual- and tri-band bandpass filters using single improved ring resonator and simple feed scheme," *Microwave Opt. Technol. Lett.*, vol. 56, no. 3, pp. 574-577, March 2014.
- [248] N. Feng, Y. Yue, C. Zhu, and Q. H. Liu, "Efficient Z-Transform Implementation of the D-B CFS-PML for Truncating Multi-Term Dispersive FDTD Domains," *Appl. Computat. Electromagnetics Soc. J.*, vol. 29, no. 3, pp. 190-196, March 2014.
- [249] L. Tobon, Q. Ren, and Q. H. Liu, "Spectral-Prism Element for Multi-Scale Layered Package-Chip Co-Simulations Using the Discontinuous Galerkin Time-Domain Method," *Electromagnetics*, vol. 34, no. 3-4, invited, pp. 270-285, Feb. 2014.
- [250] J. Liu, Z. Zhao, K. Yang, and Q. H. Liu, "A Hybrid Optimization for Pattern Synthesis of Large Antenna Arrays," *Progress Electromagnetics Res.*, vol. PIER-145, pp. 81-91, 2014.
- [251] W. Jiang, N. Liu, Y. Tang, Q. H. Liu, "Mixed Finite Element Method for 2D Vector Maxwell's Eigenvalue Problem in Anisotropic Media," *Progress Electromag. Res. PIER* 148, pp. 159-170, 2014.
- [252] Z. Li, J. Wang, and Q. H. Liu, "Interpolation-Free Stolt Mapping for SAR Imaging," *IEEE Geosci. Remote Sensing Lett.*, vol. 11, no. 5, pp. 926-929, May 2014.
- [253] K. D. Xu, Y. H. Zhang, L. Wang, M. Q. Yuan, W. T. Joines, and Q. H. Liu, "Two Memristor SPICE Models and Their Applications in Microwave Devices *IEEE Trans. Nanotechnology*, vol. 13, no. 3, pp. 607-616, May 2014.
- [254] J. Wu, Z. Zhao, Z. Nie, and Q. H. Liu, "Design of Anti-Phase Feeding Network for W8JK Array Based on In-Phase Power Divider," *IEEE Trans. Antennas Propagat.*, vol. 62, no. 5, pp. 2870-2873, May 2014.
- [255] F. Li, Q. H. Liu, and D. P. Klemmer, "Plasmon Resonance Effects in GaAs/AlGaAs Heterojunction Devices: An Analysis Based on Spectral Element Simulation," *IEEE Trans. Electron Devices*, vol. 61, no. 5, pp. 1477-1482, May 2014.
- [256] J. Wu, Z. Zhao, M. Ellis, Z. Nie, and Q. H. Liu, "Enhanced directivity and bandwidth of a stepped open-slot antenna with L-shaped slots and parasitic strip," *IET Microwaves Antennas, Propagat.*, vol. 8, no. 7, pp. 465-473, May 2014.
- [257] J. Wu, Z. Zhao, Z. Nie, and Q. H. Liu, "Design of a Wideband Planar Printed Quasi-Yagi Antenna Using Stepped Connection Structure," *IEEE Trans. Antennas Propagat.*, vol. 62, no. 6, pp. 3431-3435, June 2014.
- [258] J. Zheng, T. Su, W. Zhu, and Q. H. Liu, "ISAR Imaging of Targets With Complex Motions Based on the Keystone Time-Chirp Rate Distribution," *IEEE Geosci. Remote Sensing Lett.*, vol. 11, no. 7, pp. 1275-1279, July 2014.
- [259] X. Zhu, Z. Zhao, J. Wang, G. Chen, and Q. H. Liu, "Active Adjoint Modeling Method in Microwave Induced Thermoacoustic Tomography for Breast Tumor," *IEEE Trans. Biomed. Eng.*, vol. 61, no. 7, pp. 1957-1966, July 2014.
- [260] K.-D. Xu, Y.-H. Zhang, J. L.-W. Li, W. T. Joines, and Q. H. Liu, "Compact ultra-wideband bandpass filter using quad-T-stub-loaded ring structure," *Microwave Opt. Technol. Lett.*, vol. 56, no. 9, pp. 1988-1991, Sept. 2014.
- [261] Z. Yu, M. Chai, J. A. Mix, K. P. Slattery, Q. H. Liu, "Inverse Source Solver for a High Resolution Near Field Scanner in Microelectronic Applications," *IEEE Trans. Compon. Packag. Manufact. Technol.*, vol. 4, no. 9, pp. 1495-1502, Sept. 2014.
- [262] J. Wu, Z. Li, Y. Huang, and Q. H. Liu, "A Generalized Omega-K Algorithm to Process Translationally Variant Bistatic-SAR Data Based on Two-Dimensional Stolt Mapping," *IEEE Trans. Geosci. Remote Sensing*, vol. 52, no. 10, pp. 6597-6614, Oct. 2014.
- [263] J. Wu, Z. Li, Y. Huang, J. Yang, and Q. H. Liu, "An Omega-K Algorithm for Translational Invariant Bistatic SAR Based on Generalized Loffeld's Bistatic Formula," *IEEE Trans. Geosci. Remote Sensing*, vol. 52, no. 10, pp. 6699-6714, Oct. 2014.

- [264] J. Niu, M. Luo, Y. Fang, Q. H. Liu, "Boundary integral spectral element method analyses of extreme ultraviolet multilayer defects," *J. Opt. Soc. Am. A*, vol. 31, no. 10, pp. 2203-2209, Oct. 2014.
- [265] S. Lei, Z. Zhao, Z. Nie, Q. H. Liu, "A CFAR Adaptive Subspace Detector Based on a Single Observation in System-Dependent Clutter Background," *IEEE Trans. Signal Processing*, vol. 62, no. 20, pp. 5260-5269, Oct. 2014.
- [266] J. Zheng, T. Su, L. Zhang, W. Zhu, and Q. H. Liu, "ISAR Imaging of Targets With Complex Motion Based on the Chirp Rate-Quadratic Chirp Rate Distribution," *IEEE Trans. Geosci. Remote Sensing*, vol. 52, no. 11, pp. 7276-7289, Nov. 2014.
- [267] J. Wu, Z. Zhao, M. S. Ellis, Z. Nie, Q. H. Liu, "Printed double-dipole antenna with high directivity using a new feeding structure," *IET Microwaves Antennas Propagat.*, vol. 8, no. 14, pp. 1186-1191, Nov. 2014.
- [268] Z. Yu, W. Zhang, and Q. H. Liu, "A Mixed-order Stabilized Biconjugate Gradient FFT Method for Magnetodielectric Objects," *IEEE Trans. Antennas Propagat.*, vol. 62, no. 11, pp. 5647-5655, Nov. 2014.
- [269] G. Ye, C. Deng, and Q. H. Liu, "The PSTD Method with the 4th-Order Time Integration for 3D TAT Reconstruction of a Breast Model," *J. Computat. Acoustics*, vol. 22, no. 4, Dec. 2014.
- [270] J. Liu, Z. Zhao, M. Yuan, G. A. Ybarra, Q. H. Liu, "The Filter Diagonalization Method in Antenna Array Optimization for Pattern Synthesis," *IEEE Trans. Antennas Propagat.*, vol. 62, no. 12, pp. 6123-6130, Dec. 2014.
- [271] W. Zhang, Q. H. Liu, "Three-Dimensional Scattering and Inverse Scattering from Objects With Simultaneous Permittivity and Permeability Contrasts," *IEEE Trans. Geosci. Remote Sensing*, vol. 53, no. 1, pp. 429-439, Jan. 2015.
- [272] S. Lei, Z. Zhao, Z. Nie, Q. H. Liu, "Adaptive polarimetric detection method for target in partially homogeneous background," *Signal Processing*, vol. 106, pp. 301-311, Jan. 2015.
- [273] Y. J. Cai, J. F. Zhu, and Q. H. Liu, "Tunable enhanced optical absorption of graphene using plasmonic perfect absorbers," *Appl. Phys. Lett.*, vol. 106, no. 4, 043105, Jan. 2015.
- [274] J. Wang, Z. Zhao, Z. Nie, Q. H. Liu, "Electromagnetic Inverse Scattering Series Method for Positioning Three-Dimensional Targets in Near-Surface Two-Layer Medium With Unknown Dielectric Properties," *IEEE Geosci. Remote Sensing Lett.*, vol. 12, no. 2, pp. 299-303, Feb. 2015.
- [275] K. D. Xu, Y. H. Zhang, R. Spiegel, W. T. Joines, and Q. H. Liu, "Design of a Stub-Loaded Ring-Resonator Slot for Antenna Applications," *IEEE Trans. Antennas Propagat.*, vol. 63, no. 2, pp. 517-524, Feb. 2015.
- [276] C. H. Zhu, Q. H. Liu, L. J. Liu, Y. H. Liu, "An Accurate Conformal Fourier Transform Method for 3D Discontinuous Functions," *IEEE Trans. Antennas Propagat.*, vol. 63, no. 2, pp. 804-809, Feb. 2015.
- [277] N. Liu, L. Tobon, Y. Tang, Q. H. Liu, "Mixed Spectral Element Method for 2D Maxwell Eigenvalue Problem," *Communications in Computational Physics*, vol. 17, no. 2, pp. 458-486, 2015.
- [278] L. E. Tobon, Q. Ren, and Q. H. Liu, "A new efficient 3D Discontinuous Galerkin Time Domain (DGTD) method for large and multiscale electromagnetic simulations," *J. Computat. Phys.*, vol. 283, pp. 374-387, Feb. 2015.
- [279] N. Liu, L. Tobon, Y. Zhao, Y. Tang, Q. H. Liu, "Mixed Spectral Element Method for 3-D Maxwell Eigenvalue Problem," *IEEE Transactions on Microwave Theory and Techniques*, vol. 64, no. 2, pp. 317-325, 2015.
- [280] K. D. Xu, Y. H. Zhang, Y. Fan, W. T. Joines, and Q. H. Liu, "Microstrip dual-mode bandpass filter design using pie-section truncated semi-circle and quarter-circle resonators," *IET Microwaves Antennas Propagat.*, Vol. 9, no. 3, pp. 224-229, Feb. 2015.
- [281] J. Niu, M. Luo, J. F. Zhu, and Q. H. Liu, "Enhanced plasmonic light absorption engineering of graphene: simulation by boundary-integral spectral element method," *Optics Express*, vol. 23, no. 4, pp. 4539-4551, Feb. 2015.
- [282] J. Song, Z. Q. Zhao, J. G. Wang, X. Z. Zhu, J. N. Wu, Z. P. Nie, and Q. H. Liu, "Evaluation of Contrast Enhancement by Carbon Nanotubes for Microwave-Induced Thermoacoustic Tomography," *IEEE Trans. Biomed. Eng.*, vol. 62, no. 3, pp. 930-938, March 2015.
- [283] J. Zheng, T. Su, L. Zhang, W. Zhu, X. H. He, and Q. H. Liu, "Radar High-Speed Target Detection Based on the Scaled Inverse Fourier Transform," *IEEE Jo. Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 8, no. 3, pp. 1108-1119, March 2015.
- [284] Z. Li, J. Wang, J. Wu, Q. H. Liu, "A Fast Radial Scanned Near-Field 3-D SAR Imaging System and the Reconstruction Method," *IEEE Trans. Geosci. Remote Sensing*, vol. 53, no. 3, pp. 1355-1363, Mar. 2015.

- [285] N. X. Feng, Y. Q., Yue, C. H. Zhu, L. T. Wan, and Q. H. Liu, "Second-order PML: Optimal choice of nth-order PML for truncating FDTD domains," *J. Computat. Phys.*, vol. 285, pp. 71-83, March 2015.
- [286] N. Li, G. L. Cui, L. J. Kong, and Q. H. Liu, "Moving target detection for polarimetric multiple-input multiple-output radar in Gaussian clutter," *IET Radar Sonar and Navigation*, vol. 9, no. 3, pp. 285-298, March 2015.
- [287] N. X. Feng, Y. Q. Yue, and Q. H. Liu, "Direct Z-Transform Implementation of the CFS-PML Based on Memory-Minimized Method," *IEEE Trans. Microwave Theory Tech.*, vol. 63, no. 3, pp. 877-882, March 2015.
- [288] H. N. Yang, T. J. Li, Z. M. He, and Q. H. Liu, "Impulse Borehole Radar Imaging Based on Compressive Sensing," *IEEE Geosci. Remote Sensing Lett.*, vol. 12, no. 4, pp. 766-770, April 2015.
- [289] Z. Li, J. Wang, and Q. H. Liu, "Frequency-Domain Backprojection Algorithm for Synthetic Aperture Radar Imaging," *IEEE Geosci. Remote Sensing Lett.*, vol. 12, no. 4, pp. 905-909, April 2015.
- [290] J. N. Wu, Z. Q. Zhao, and Q. H. Liu, "A novel vivaldi antenna with extended ground plate stubs for ultrawideband applications," *Microwave Opt. Technol. Lett.*, vol. 57, no. 4, pp. 983-987, April 2015.
- [291] Y. H. Liu, L. Zhang, C. H. Zhu, and Q. H. Liu, "Synthesis of Nonuniformly Spaced Linear Arrays With Frequency-Invariant Patterns by the Generalized Matrix Pencil Methods," *IEEE Trans. Antennas Propagat.*, vol. 63, no. 4, pp. 1614-1625, April 2015.
- [292] J. N. Wu, Z. Q. Zhao, Z. P. Nie, and Q. H. Liu, "A Printed Unidirectional Antenna With Improved Upper Band-Edge Selectivity Using a Parasitic Loop," *IEEE Trans. Antennas Propagat.*, vol. 63, no. 4, pp. 1832-1837, April 2015.
- [293] P. F. You, Y. H. Liu, X. Huang, L. Zhang, and Q. H. Liu, "Efficient phase-only linear array synthesis including coupling effect by GA-FFT based on least-square active element pattern expansion method," *Electronics Letters*, vol. 51, no. 10, pp. 791, 2015.
- [294] N. Li, G. L. Cui, H. N. Yang, L. J. Kong, Q. H. Liu, S. Iommelli, "Adaptive detection of moving target with MIMO radar in heterogeneous environments based on Rao and Wald tests," *Signal Processing*, vol. 114, pp. 198-208, 2015.
- [295] M. Luo, and Q. H. Liu, "Extraordinary enhancement of second harmonic generation in a periodically patterned distributed Bragg reflector," *J. Opt. Soc. Am. B*, Vol. 32, No. 6, pp. 1193-1201, June 2015.
- [296] Q. Ren, L. E. Tobon, Q. T. Sun, and Q. H. Liu, "A New 3-D Nonspurious Discontinuous Galerkin Spectral Element Time-Domain (DG-SETD) Method for Maxwell's Equations," *IEEE Trans. Antennas Propagat.*, vol.63, no. 6, pp. 2585-2594, 2015.
- [297] L. Zhang, Z. Y. Song, and Q. H. Liu, "Optical cross-polarization converter with an octave bandwidth based on anisotropic plasmonic meta-surfaces," *Europ. Phys. Lett.*, vol. 111, no. 2, 27001, 2015, DOI 10.1209/0295-5075/111/27001.
- [298] M. S. Ellis, Z. Q. Zhao, J. N. Wu, Z. P. Nie, and Q. H. Liu, "Small planar monopole ultra-wideband antenna with reduced ground plane effect," *IET Microwaves Antenna Propagat.*, vol. 9, no. 10, pp. 1028-1034, 2015.
- [299] J. W. Dai, and Q. H. Liu, "Efficient Computation of Electromagnetic Waves in Anisotropic Orthogonal-Plano-Cylindrically Layered Media Using the Improved Numerical Mode Matching (NMM) Method," *IEEE Trans. Antennas Propagat.*, vol. 63, no. 8, pp. 3569-3578, 2015.
- [300] N. Li, G. L. Cui, H. N. Yang, L. J. Kong, Q. H. Liu, and S. Iommelli, "Adaptive detection of moving target with MIMO radar in heterogeneous environments based on Rao and Wald tests," *Signal Processing*, vol. 114, pp. 198-208, 2015.
- [301] J. B. Zheng, T. Su, W. T. Zhu, L. Zhang, Z. Liu, and Q. H. Liu, "ISAR Imaging of Nonuniformly Rotating Target Based on a Fast Parameter Estimation Algorithm of Cubic Phase Signal," *IEEE Trans. Geosci. Remote Sensing*, vol. 53, no. 9, pp. 4727-4740, 2015.
- [302] H. N. Yang, T. J. Li, N. Li, Z. M. He, and Q. H. Liu, "Efficient Near-Field Imaging for Single-Borehole Radar With Widely Separated Transceivers," *IEEE Trans. Geosci. Remote Sensing*, vol. 53, no. 10, pp. 5327-5337, 2015.

B. Book Chapters

- [303] Q. H. Liu, "Some current trends in numerical methods for transient acoustic and elastic waves in multi-dimensional inhomogeneous media," in *Current Topics in Acoustical Research*, Research Trends, vol. 2, pp. 31-42, 1998.
- [304] Q. H. Liu, and Z. Q. Zhang, "FFT-Accelerated Fast Forward and Inverse Scattering Methods for Microwave Imaging," *Microwave Nondestructive Evaluation and Imaging*, Research Signpost. Editor: M.

Pastorino, 2002.

- [305] Q. H. Liu, G.-X. Fan, G. Zhao, and Y. Zeng, "The PSTD methods for computational electromagnetics," Recent Research Developments in Microwave Theory and Techniques, Transworld Research Network. Editors: B. Baker, and Y. Chen, 2002.
- [306] Q. H. Liu, "Fast Fourier Transforms and NUFFT," *Encyclopedia of RF and Microwave Engineering*, pp. 1401-1418, Wiley-Interscience. Editor: K. Chang, Jan. 2005.
- [307] Q. H. Liu, and G. Zhao, "Advances in PSTD Techniques." Chapter 17, *Computational Electromagnetics: The Finite-Difference Time-Domain Method*, A. Taflove, and S. Hagness, Artech House, Inc., 2005.
- [308] W. T. Joines, Q. H. Liu, and G. Ybarra, "Electromagnetic Imaging of Biological Systems," in *CRC Handbook on Biological Effects of Electromagnetic Fields*, eds. B. Greenebaum and F. Barnes. 2006.
- [309] G. A. Ybarra, Q. H. Liu, J. Stang, W. T. Joines, "Microwave Breast Imaging," in *Emerging Technologies in Breast Imaging and Mammography*, ed.: J. Suri, R. M. Rangayyan, and S. Laxminarayan, American Scientific Publishers, 2008.
- [310] G. A. Ybarra, Q. H. Liu, G. Ye, K. H. Lim, R. George, W. T. Joines, Breast Imaging using Electrical Impedance Tomography (EIT)," in *Emerging Technologies in Breast Imaging and Mammography*, ed.: J. Suri, R. M. Rangayyan, and S. Laxminarayan, American Scientific Publishers, 2008.

C. Refereed Conference Proceedings

- [311] W. C. Chew, and Q. Liu, "Resonance frequency of a microstrip patch," Proc. 1987 Antennas Applications Symposium, University of Illinois, 1987.
- [312] Q. Liu, and W. C. Chew, "Simple formulas for the resonant frequencies of microstrip patches," Intl. IEEE AP-S Symposium, Syracuse, NY, 1988.
- [313] W. C. Chew, B. Anderson, E. Yannakakis, M. Moghaddam, and Q. H. Liu, "Computation of transient electromagnetic waves in inhomogeneous media," Proceedings of the 1989 URSI International Symposium on Electromagnetic Theory, pp. 310-312, Stockholm, Sweden, August 1989.
- [314] W. C. Chew, Z. Nie, Q. H. Liu, and Y. T. Lo, "Some methods of analysis of a probe-fed microstrip disk antenna," 1990 Intl. IEEE AP-S Symposium, Dallas, TX, pp. 346-349, May 1990.
- [315] W. C. Chew, Z. Nie, Q. H. Liu, and B. Anderson, "A full wave analysis of wave propagation in multiregion, cylindrically stratified media," 1990 Intl. IEEE AP-S Symposium, Dallas, TX, pp. 602-605, May 1990.
- [316] W. C. Chew, Z. Nie, Q. H. Liu, and B. Anderson, "Modeling of well logging tools in a multi-bed environment with invasions," 10th Intl. Geoscience & Remote Sensing Symposium, Washington, D. C., May, 1990.
- [317] Q. H. Liu, B. Anderson, and T. Barber, "Interpretation of multiarray logs in complex formations," SPWLA, Oklahoma City, OK, June 1992.
- [318] Q. H. Liu, B. Anderson, and M. G. Luling, "Supporting interpretation of invaded thin beds with forward modeling of induction and 2-MHz resistivity tools in 2-D axisymmetric formations," 1992 Intl. Geoscience & Remote Sensing Symposium (IGARSS'92), Houston, TX, May 1992.
- [319] Q. H. Liu, "Modeling of a $2\frac{1}{2}$ -dimensional problem in electromagnetic well logging," 1992 Intl. Geoscience & Remote Sensing Symposium (IGARSS'92), Houston, TX, May 1992.
- [320] Q. H. Liu, "Radiation of an off-axis point source in a cylindrical medium with an arbitrary number of layers in radial and axial directions," 1992 Intl. IEEE AP-S Symposium, Chicago, IL, July 1992.
- [321] Q. H. Liu, and W. C. Chew, "A CG-FFHT method for the solution of EM field in axisymmetric inhomogeneous media," Proceedings of the 9th Annual Review of Progress in Applied Computational Electromagnetics, pp. 672-677, Monterey, CA, March 1993.
- [322] D. F. Allen, B. I. Anderson, T. Barber, Q. H. Liu, and M. G. Luling, "Supporting interpretation of complex, axisymmetric invasion by modeling wireline induction and 2-MHz LWD resistivity tools," SPWLA Annual Symposium, Calgary, Alberta, Canada, June 1993.
- [323] Q. H. Liu, "DBIM for the inversion of two-dimensional axisymmetric inhomogeneous media," 1993 Intl. IEEE AP-S Symposium, Ann Arbor, MI, June 1993.
- [324] Q. H. Liu, B. Anderson, and W. C. Chew, "Modeling low-frequency electrode-type resistivity tools in 2-D formations," 1993 Intl. Geoscience & Remote Sensing Symposium (IGARSS'93), Tokyo, Japan, August 1993.
- [325] Q. H. Liu, and C. Chang, "Compressional head waves in attenuative formations," SEG Intl. Exposition & 64th Annual Meeting, Extended Abstract, pp. 12-15, Oct. 1994.

- [326] B. K. Sinha, and Q. H. Liu, "Flexural waves in pressurized boreholes: A finite-difference approach," 65th Ann. Internat. Mtg., Soc. Expl. Geophys., Expanded Abstract, pp. 26-29, Oct. 1995.
- [327] W. C. Chew, and Q. H. Liu, "Using perfectly matched layers for elastodynamics," 1996 Intl. IEEE AP-S Symposium Digest, Baltimore, MD, July 1996.
- [328] Q. H. Liu, "The pseudospectral time-domain (PSTD) method: A new algorithm for solutions of Maxwell's equations," Intl. IEEE AP-S Symposium Digest, pp. 122-125, Montreal, Canada, July 1997.
- [329] Q. H. Liu, "Finite-difference and pseudospectral time-domain methods for subsurface radar applications," Intl. IEEE AP-S Symposium Digest, pp. 990-993, Montreal, Canada, July 1997.
- [330] Q. H. Liu, "A new numerical method for large-scale complex media: The PSTD algorithm," Proc. 17th Intl. Geoscience & Remote Sensing Symposium (IGARSS'97), Singapore, August 1997.
- [331] Q. H. Liu, "Using GPR and seismic reflection measurements to characterize buried objects: Large-scale simulations," Proc. 17th Intl. Geoscience & Remote Sensing Symposium (IGARSS'97), Singapore, August 1997.
- [332] Q. H. Liu, Y.-L. Li, and J. C. Liao, "The PSTD algorithm: a fast and accurate method for electronic package characterization," Electrical Performance of Electronic Packaging Conference, San Jose, CA, October 1997.
- [333] Y. H. Chen, W. C. Chew, and Q. H. Liu, "A three-dimensional finite difference code for the modeling of sonic logging tools," 67th Ann. Internat. Mtg., Soc. Expl. Geophys., Expanded Abstract, October 1997.
- [334] Q. H. Liu, and J. Q. He, "A PSTD algorithm in cylindrical coordinates," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [335] G.-X. Fan, and Q. H. Liu, "A PML-FDTD algorithm for general dispersive media," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [336] Q. H. Liu, "On the PSTD method for large-scale problems," media," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [337] Q. H. Liu, and N. Nguyen, "An accurate algorithm for nonuniform fast Fourier transforms (NUFFT's) and its applications," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [338] J.-Q. He, and Q. H. Liu, "A systematic study of three PML absorbing boundary conditions through a unified formulation in cylindrical coordinates," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [339] Q. H. Liu, "A new algorithm for simulations of GPR and acoustic reflection measurements," 7th Intl. Conf. Ground Penetrating Radar, Lawrence, KS, May 1998.
- [340] J.-Q. He, and Q. H. Liu, "Borehole radar modeling with a nonuniform cylindrical FDTD algorithm," 7th Intl. Conf. Ground Penetrating Radar, Lawrence, KS, May 1998.
- [341] G.-X. Fan, and Q. H. Liu, "A 3D PML-FDTD algorithm for simulating ground-penetrating radar on dispersive earth media," 7th Intl. Conf. Ground Penetrating Radar, Lawrence, KS, May 1998.
- [342] G.-X. Fan, and Q. H. Liu, "A PML-FDTD algorithm for general dispersive media in GPR and plasma applications," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [343] Q. H. Liu, N. Nguyen, "Nonuniform fast Fourier transform (NUFFT) algorithm and its applications," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [344] X. Y. Tang, and Q. H. Liu, "CG-FFT for Nonuniform Inverse Fast Fourier Transforms (NU-IFFT's)," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [345] Z. B. Tang, and Q. H. Liu, "The 2.5D pseudospectral time-domain (PSTD) algorithm with PML absorbing boundary condition," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [346] G.-X. Fan, and Q. H. Liu, "Dyadic Green's functions for curved waveguides and cavities and their reformulation," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [347] Q. H. Liu, and J.-Q. He, "An efficient PSTD algorithm in cylindrical coordinates," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [348] J.-Q. He, and Q. H. Liu, "A nonuniform cylindrical FDTD algorithm using new split PML formulations," Intl. IEEE AP-S Symposium Digest, Atlanta, GA, June 1998.
- [349] Q. H. Liu, N. Nguyen, and X. Y. Tang, "Accurate algorithms for nonuniform fast forward and inverse Fourier transforms and their applications," Intl. Geoscience Remote Sensing Symposium (IGARSS'98), Seattle, WA, July 1998.
- [350] J.-Q. He, and Q. H. Liu, "A nonuniform cylindrical FDTD algorithm with PML for borehole radar modeling," Intl. Geoscience Remote Sensing Symposium (IGARSS'98), Seattle, WA, July 1998.
- [351] Q. H. Liu, and G.-X. Fan, "A PSTD algorithm for general dispersive media and its applications to GPR simulations," Intl. Geoscience Remote Sensing Symposium (IGARSS'98), Seattle, WA, July 1998.

- [352] X. Xu, and Q. H. Liu, "The conjugate-gradient nonuniform fast Fourier transform (CG-NUFFT) method and its applications in subsurface sensing," Intl. Geoscience Remote Sensing Symposium (IGARSS'99), Hamburg, Germany, 1999.
- [353] H. Jiang, and Q. H. Liu, "2.5-D cylindrical PSTD and nonuniform FDTD methods," Intl. Geoscience Remote Sensing Symposium (IGARSS'99), Hamburg, Germany, 1999.
- [354] Q. H. Liu, "Multidimensional nonuniform fast forward and inverse Fourier transforms," Intl. Geoscience Remote Sensing Symposium (IGARSS'99), Hamburg, Germany, 1999.
- [355] Q. H. Liu, "PML and PSTD algorithm for arbitrary lossy bianisotropic media," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [356] H. Jiang, and Q. H. Liu, "A 2.5-D PSTD algorithm in cylindrical coordinates," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [357] Q. H. Liu, G.-X. Fan, "Frequency-dependent PSTD method and its applications to GPR modeling," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [358] Q. H. Liu, "PML-FDTD method for elastic waves in cylindrical and spherical coordinates," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [359] B. Tian, and Q. H. Liu, "Nonuniform fast cosine transform and the Chebyshev PSTD algorithm," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [360] S. P. Blanchard, G.-X. Fan, and Q. H. Liu, "3-D numerical mode-matching (NMM) method for inhomogeneous media," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [361] G.-X. Fan, and Q. H. Liu, "Pseudospectral time-domain algorithm applied to electromagnetic scattering from electrically large objects," Intl. IEEE AP-S Symposium Digest, Orlando, FL, July 1999.
- [362] B. K. Sinha, Q. H. Liu, T. J. Plona, and K. W. Winkler, "A finite-difference formulation of borehole wave propagation in prestressed formations," 69th Annual Meeting of Society of Exploration Geophysicists, Houston, TX, *Expanded Abstracts*, vol. 1, pp. 49-52, 1999.
- [363] G.-X. Fan, and Q. H. Liu, "Fast Fourier transform of functions with jump discontinuities," in *Proc. 16th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [364] Q. H. Liu, X. M. Xu, and Z. Q. Zhang, "Applications of nonuniform fast transform algorithms in numerical solutions of integral equations," in *Proc. 16th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [365] Q. H. Liu, X. M. Xu, and Z. Q. Zhang, "Applications of nonuniform fast Fourier transform (NUFFT) algorithms in subsurface sensing," *AP2000 Millennium Conference on Antennas and Propagation*, Davos, Switzerland, April 2000.
- [366] Y. Q. Zeng, and Q. H. Liu, "A poroelastic model for acoustic landmine detection," in *Proc. SPIE*, Orlando, FL, April 2000.
- [367] X. M. Xu, and Q. H. Liu, "The conjugate-gradient nonuniform fast Fourier transform (CG-NUFFT) method for one and two-dimensional media," Intl. IEEE AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [368] G.-X. Fan, Q. H. Liu, "Fast Fourier transform of functions with jump discontinuities," Intl. IEEE AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [369] Q. H. Liu and Z. Q. Zhang, and X. M. Xu, "A spectral hybrid EBA method for integral equations," Intl. IEEE AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [370] Z. Q. Zhang, and Q. H. Liu, "The hybrid extended Born approximation and CG-FFH method for axisymmetric media," Intl. IEEE AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [371] Z. Q. Zhang, and Q. H. Liu, "Simulation of borehole induction using the hybrid extended Born approximation and CG-FFHT method," in *Proc. SPIE*, San Diego, CA, July 2000.
- [372] Q. H. Liu and Z. Q. Zhang, "A novel inverse algorithm for borehole induction measurements Using a spectral hybrid EBA forward method," in *Proc. SPIE*, San Diego, CA, July 2000.
- [373] Y. Zeng, and Q. H. Liu, "Acoustic landmine detection: A 3D poroelastic model," *Proc. SPIE*, Orlando, FL, April 2001.
- [374] Z. Q. Zhang, and Q. H. Liu, "Microwave imaging for breast tumor: 2D forward and inverse methods," Intl. IEEE AP-S Symposium Digest, Boston, MA, July 2001.
- [375] Z. Q. Zhang, and Q. H. Liu, "Simulation of 3D EM fields by a weak-Form biconjugate gradient FFT method," Intl. IEEE AP-S Symposium Digest, Boston, MA, July 2001.
- [376] Z. Q. Zhang, and Q. H. Liu, "Two nonlinear inverse methods for electromagnetic induction measurements," Intl. IEEE AP-S Symposium Digest, Boston, MA, July 2001.
- [377] G.-X. Fan, and Q. H. Liu, "A well-posed PML ABC for lossy media," *IEEE Antennas and Propagation Soc. Intl. Symp.*, vol. 3, pp. 2-5, July 2001.

- [378] Q. H. Liu, and Z. Q. Zhang, "RCS calculation for large inhomogeneous penetrable objects," Intl. IEEE AP-S Symposium Digest, Boston, MA, July 2001.
- [379] G.-X. Fan, and Q. H. Liu, "Multi-domain pseudospectral time-domain method for lossy media," Intl. IEEE AP-S Symposium Digest, Boston, MA, July 2001.
- [380] Z. Q. Zhang, and Q. H. Liu, "Applications of Microwave Imaging to three-dimensional biological tissues," Intl. IEEE AP-S Symposium Digest, San Antonio, TX, June 2002.
- [381] X. M. Xu, Q. H. Liu, and Z. Q. Zhang, "The stabilized biconjugate gradient fast Fourier transform method for electromagnetic scattering," Intl. IEEE/AP-S Symposium Digest, San Antonio, TX, June 2002.
- [382] G. Zhao, and Q. H. Liu, "Applications of the 2.5-D multidomain pseudospectral time-domain algorithm," Intl. IEEE AP-S Symposium Digest, San Antonio, TX, June 2002.
- [383] L. Sha, L. Nolte, Z. Q. Zhang, and Q. H. Liu, "Performance analysis for Bayesian microwave imaging in decision aided breast tumor diagnosis," *ISBI 2002 Proc.*, Washington, D.C., July 2002.
- [384] B. K. Sinha, and Q. H. Liu, "Acoustic waves in pressurized boreholes in formations with triaxial stresses," *IEEE Ultrasonics Symposium, 2002. Proceedings*, vol. 1, pp. 505-510, Oct. 8-11, 2002.
- [385] Q. H. Liu, and G. Zhao, "Review of PSTD Methods for Transient Electromagnetics," 5th International Workshop on Computat. Electromagnetics in Time Domain-TLM, FDTD and Other Techniques (CEM-2003), Halifax, Nova Scotia, Canada, June 2003.
- [386] T. Xiao, and Q. H. Liu, "Unstructured-grid spectral method for 3D Maxwell's equations with well-posed PML," Intl. IEEE/AP-S Symposium Digest, Columbus, OH, June 2003.
- [387] T. Xiao, and Q. H. Liu, "A staggered time integration technique for spectral methods," Intl. IEEE AP-S Symposium Digest, vol. 1, pp. 694-697, Columbus, OH, June 2003.
- [388] G. Zhao, and Q. H. Liu, "Unconditionally stable multidomain pseudospectral time-domain (PSTD) method," Intl. IEEE/AP-S Symposium Digest, vol. 1, pp. 336-339, Columbus, OH, June 2003.
- [389] G. Zhao, and Q. H. Liu, "The 3-D multidomain pseudospectral time-domain algorithm for inhomogeneous conductive media," Intl. IEEE AP-S Symposium Digest, vol. 3, pp. 559-562, Columbus, OH, June 2003.
- [390] L.-P. Song, Q. H. Liu, F. Li, and Z. Q. Zhang, "GPR landmine imaging: 2D migration and 3D inverse scattering in layered media," 2004 URSI EMTS Intl. Symposium on Electromagnetic Theory, vol. 1, pp. 391-393, May 2004.
- [391] F. Li, Q. H. Liu, and L.-P. Song, "Reconstruction of 3-D objects buried in layered media using Born and distorted Born iterative methods," 2004 URSI EMTS Intl. Symposium on Electromagnetic Theory, vol. 1, pp. 1095-1097, May 2004.
- [392] F. Li, L.-P. Song, and Q. H. Liu, "Three-Dimensional Reconstruction of Objects Buried in Layered Media," Intl. IEEE/AP-S Symposium Digest, Monterey, CA, June 2004.
- [393] J. Liu, and Q. H. Liu, "An Embedded Boundary Method to Eliminate the ADI-FDTD Staircasing Error," Intl. IEEE/AP-S Symposium Digest, Monterey, CA, June 2004.
- [394] L.P. Song, Q. H. Liu, and F. Li, "3D Nonlinear Electromagnetic Inversion for Buried Objects in Layered Media," Intl. IEEE/AP-S Symposium Digest, Monterey, CA, June 2004.
- [395] L.P. Song, C. Yu, and Q. H. Liu, "2-D Nonlinear Image Reconstruction for Buried Objects in Layered Media," Intl. IEEE AP-S Symposium Digest, Washington, DC, July 2005.
- [396] L.P. Song, C. Yu, and Q. H. Liu, "Image Reconstruction from Measured Scattering Data," Intl. IEEE AP-S Symposium Digest, Washington, DC, July 2005.
- [397] G. Ye, K. H. Lim, R. George, G. Ybarra, W. T. Joines, and Q. H. Liu, "A 3D EIT System for Breast Cancer Imaging," 2006 IEEE International Symposium on Biomedical Imaging Proc., pp. 1092-1093, Washington D.C., 2006.
- [398] J. Song, and Q. H. Liu, "A Novel MR Image Reconstruction for Arbitrary K-space Trajectory without Density Compensation," IEEE 2006 Intl. Conf. Eng. Med. Biol. Soc., New York, NY, Sept. 2006.
- [399] M. Chai, and Q. H. Liu, "A Hybrid PSTD-FDTD Method for Indoor Wireless Communication Systems," Intl. IEEE AP-S Symposium Digest, Honolulu, HI, June 2007.
- [400] J. H. Lee, and Q. H. Liu, "Nanophotonic Applications of the Discontinuous Spectral Element Time-Domain (DG-SETD) Method," Intl. IEEE AP-S Symposium Digest, Honolulu, HI, June 2007.
- [401] Q. H. Liu, C. Yu, J. Stang, M. Yuan, E. Bresslour, R. T. George, G. A. Ybarra, W. T. Joines, "Experimental and Numerical Investigations of a High-Resolution 3D Microwave Imaging System for Breast Cancer Detection," Intl. IEEE AP-S Symposium Digest, Honolulu, HI, June 2007.

- [402] J. Liu, Y. Lin, J. H. Lee, E. Simsek, and Q. H. Liu, "Application of the Hybrid Spectral Integral Method with Spectral Element Method," Intl. IEEE AP-S Symposium Digest, Honolulu, HI, June 2007.
- [403] Q. H. Liu, "Fast Algorithms in Inversion and Imaging," (Invited Speaker for a one-week lecture), 2007 Inversion and Imaging National Postgraduate Summer School, Chengdu, China, July 2007.
- [404] J. Wang, Q.-F. Liu, W.-Y. Yin, J.-F. Mao, Q. H. Liu, "A new conformal technique for FDTD (2, 4) scheme for modeling perfectly conducting composites," Asia-Pacific Symposium on Electromagnetic Compatibility and 19th International Zurich Symposium on Electromagnetic Compatibility, pp. 64-67, Singapore, May 2008.
- [405] F.-Z. Kong, W.-Y. Yin, J.-F. Mao, and Q. H. Liu, Hybrid Physical Field Simulation: Transient Electro-Thermo-Mechanical Responses of Interwafer Interconnects under the Impact of an EMP, Intl. IEEE/AP-S Symposium Digest, San Diego, CA, June 2008.
- [406] Y. Liu, Z. Nie, Z. Zhao, and Q. H. Liu, "A cascaded correction method to reduce the contamination of ionospheric frequency modulation for HF skywave radars," Intl. IEEE AP-S Symposium Digest, Charleston, SC, June 2009.
- [407] Q. H. Liu, "Application of PML to electromagnetics, acoustics, elasticity, and quantum mechanics," invited, Intl. IEEE AP-S Symposium Digest, Charleston, SC, June 2009.
- [408] Y. B. Shi, W. Y. Yin, and Q. H. Liu, Electro-Thermal Investigation on Transient Temperature Responses of Active Semiconductor Devices under the Impact of an EMP, Intl. IEEE/AP-S Symposium Digest, Charleston, SC, June 2009.
- [409] Y. Huang, Q. H. Liu, J. Zhang, "Fast three-dimensional GPR forward and inverse scattering based on wideband diagonal tensor approximation," 14th Biennial IEEE Conference on Electromagnetic Field Computation (IEEE CEFC2010), Chicago, IL, May 2010.
- [410] Y. Huang, J. Chen, J. Zhang, Q. H. Liu, "A Parallel High Precision Integration Scheme with Spectral Element Method for Transient Electromagnetic Computation," 14th Biennial IEEE Conference on Electromagnetic Field Computation (IEEE CEFC2010), Chicago, IL, May 2010.
- [411] J. Chen, Q. H. Liu, M. Chai, J. Mix, "Analysis of Spurious Modes in Mixed Finite Element Method for Maxwell's Equation with E and H as Variables," 14th Biennial IEEE Conference on Electromagnetic Field Computation (IEEE CEFC2010), Chicago, IL, May 2010.
- [412] C. E. Kim, M. H. Jeon, P. S. Shin, Q. H. Liu, "The Analysis of Flow Characteristics of Molten Metal Coupling Electromagnetic with Navier-Stokes Equation," 14th Biennial IEEE Conference on Electromagnetic Field Computation (IEEE CEFC2010), Chicago, IL, May 2010.
- [413] M. Luo, Q. H. Liu, "A Spectral Element Time Domain Method for Two Dimensional Electromagnetic Scattering of Dispersive Materials," Proc. 27th Annual Review of Progress in Applied Computational Electromagnetics, Williamsburg, VA, March 2011.
- [414] L. Tobon, J. Chen, Q. H. Liu, "Dispersion Analysis for Mixed Finite Element Method for Maxwell's Equations," Proc. 27th Annual Review of Progress in Applied Computational Electromagnetics, Williamsburg, VA, March 2011.
- [415] L. Tobon, J. Chen, Q. H. Liu, "Multilayer microwave filter design using a locally implicit discontinuous Galerkin finite-element time-domain (DG-FETD) method," Intl. IEEE AP-S Symposium Digest, Spokane, WA, July 2011.

D. Conference Abstracts

- [416] Q. H. Liu, and W. C. Chew, "An efficient numerical method for the multi-region vertically stratified media," National Radio Science Meeting, Boulder, Colorado, Jan. 1989.
- [417] Q. H. Liu, and W. C. Chew, "A numerical method for the obliquely stratified half-space," National Radio Science Meeting, Boulder, Colorado, Jan. 1989.
- [418] W. C. Chew, and Q. H. Liu, "A numerical method for the obliquely stratified inhomogeneous half space: basic studies in microwave remote sensing of earth surface," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 1989.
- [419] Q. H. Liu, and W. C. Chew, "Analysis of multi-rectangular dielectric waveguides by numerical mode matching method," National Radio Science Meeting, Boulder, Colorado, Jan. 1990.
- [420] Q. H. Liu, and W. C. Chew, "Analysis of discontinuities in planar dielectric waveguides: a recursive numerical mode matching method," National Radio Science Meeting, Boulder, Colorado, Jan. 1990.
- [421] W. C. Chew, Y. M. Wang, L. Gurel, J. H. Lin, Q. H. Liu, "Fast algorithms for calculating scattering by inhomogeneous and impenetrable objects," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 1991.

- [422] Q. H. Liu, and W. C. Chew, "Non-axisymmetric wave propagation in cylindrical structures with horizontal junction discontinuities," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 1991.
- [423] Q. H. Liu, and W. C. Chew, "CG-FHT-FFT method for the analysis of radiation from a loop antenna in an inhomogeneous medium with rotational symmetry," 1992 URSI Meeting, Chicago, IL, July 1992.
- [424] Q. H. Liu, "Imaging a 2-D axisymmetric inhomogeneous medium using low-frequency TM measurements," 1993 URSI Meeting, Ann Arbor, MI, June 1993.
- [425] Q. H. Liu, "Reconstruction of two-dimensional axisymmetric inhomogeneous media using induction measurements," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
- [426] Q. H. Liu, and W. C. Chew, "An efficient CG-FFHT method for the solution of EM field," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
- [427] Q. H. Liu, "Imaging a two-dimensional axisymmetric inhomogeneous medium using a TM resistivity tool," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
- [428] W. C. Chew, and Q. H. Liu, "Using CG-FFHT method to solve the borehole inverse problem at induction frequencies," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
- [429] W. C. Chew, and Q. H. Liu, "Using CG-FFHT method to solve the borehole inverse problem at induction frequencies," URSI General Assembly, Kyoto, Japan, August 1993.
- [430] Q. H. Liu, "K-Space Formulation for electromagnetic scattering problems in time domain," 1994 URSI Meeting, Seattle, WA, June 1994.
- [431] Q. H. Liu, "A new generalized k -space (GkS) method for transient elastodynamic scattering problems," 128th Meeting of the Acoustical Society of America, Austin, TX, November 1994.
- [432] Q. H. Liu, E. Schoen, F. Daube, C. Randall, H.-L. Liu, and P. Lee, "Large-scale 3D finite-difference simulation of elastic wave propagation in borehole environments," 128th Meeting of the Acoustical Society of America, Austin, TX, November 1994.
- [433] C.-C. Lu, and Q. H. Liu, "Three-dimensional dyadic Green's function for elastic waves in multilayer cylindrical structures," 128th Meeting of the Acoustical Society of America, Austin, TX, November 1994.
- [434] Q. H. Liu, "An Efficient Generalized k -Space (GkS) Method for Transient EM Subsurface Probing," (invited paper), Progress in Electromagnetics Research Symposium, Seattle, WA, July 1995.
- [435] Q. H. Liu, "A Fundamental Forward and Inverse Problem in Borehole Elastic Wave Propagation," (invited paper), Progress in Electromagnetics Research Symposium, Seattle, WA, July 1995.
- [436] Q. H. Liu, "A revisit to the k -space method for acoustic scattering problems," 2nd International Conference on Theoretical and Computational Acoustics, Honolulu, Hawaii, August 21-25, 1995.
- [437] Q. H. Liu, "A spectral-domain method with perfectly matched layers for time-domain solutions of Maxwell's equations," 1996 URSI Meeting, Baltimore, MD, July 1996.
- [438] Q. H. Liu, and J. Tao, "Perfectly matched layers for acoustic waves in viscous media: Applications to underwater acoustics," *J. Acous. Soc. Am.*, vol. 101, no. 5, Pt. 2, p. 3182, May 1997 (133rd Acoustical Society of America Meeting).
- [439] Q. H. Liu, "The PSTD algorithm: A time-domain method combining the pseudospectral technique and perfectly matched layers," *J. Acous. Soc. Am.*, vol. 101, no. 5, Pt. 2, p. 3182, May 1997 (133rd Acoustical Society of America Meeting).
- [440] W. C. Chew, and Q. H. Liu, "Perfectly matched layers for elastodynamics," PIERS'97, Boston, MA, July 1997.
- [441] J. He, and Q. H. Liu, "An FDTD method with nonuniform cylindrical grids for inhomogeneous conductive media," 1997 URSI Meeting Abstract, p. 133, Montreal, Canada, July 1997.
- [442] Q. H. Liu, "A New PML formulation for anisotropic media and PSTD algorithm," 1998 URSI Meeting Abstract, Atlanta, GA, June 1998.
- [443] Q. H. Liu, and G.-X. Fan, "A frequency-dependent PSTD algorithm for general dispersive media," 1998 URSI Meeting Abstract, Atlanta, GA, June 1998.
- [444] N. T. Nguyen, and Q. H. Liu, "The method of scaling factors for nonuniform fast Fourier transforms," 1999 Joint Mathematics Meetings, San Antonio, Tx, January 1999.
- [445] X. Xu, and Q. H. Liu, "The CG-NUFFT method for inhomogeneous media," 1999 URSI Meeting Abstract, Orlando, FL, July 1999.
- [446] Q. H. Liu, and Z. Q. Zhang, "The nonuniform fast Hankel transform and its applications for integral equations," 1999 URSI Meeting Abstract, Orlando, FL, July 1999.
- [447] Q. H. Liu, "Pseudospectral time-domain method with a nonuniform fast Fourier transform algorithm," 1999 URSI Meeting Abstract, Orlando, FL, July 1999.

- [448] Y. Q. Zeng, J. Q. He, Q. H. Liu, “The Perfectly Matched Layer (PML) for Elastic Waves in Poroelastic Media,” *J. Acous. Soc. Am.*, vol. 106, no. 4, Pt. 2, p. 2131, Nov. 1999 (138th Acoustical Society of America Meeting).
- [449] Q. H. Liu, B. Tian, X. Xu, Z. Q. Zhang, “Recent progress on nonuniform fast Fourier transform algorithms and their applications,” *Invited Talk, J. Acous. Soc. Am.*, vol. 106, no. 4, Pt. 2, p. 2135, Nov. 1999 (138th Acoustical Society of America Meeting).
- [450] Q. H. Liu, “Theory of perfectly matched layer for elastic waves and their applications in cylindrical and spherical coordinates,” *J. Acous. Soc. Am.*, vol. 106, no. 4, Pt. 2, p. 2288, Nov. 1999 (138th Acoustical Society of America Meeting).
- [451] Y. Q. Zeng, Q. H. Liu, “Detection of land mines in fluid-saturated unconsolidated soil: numerical modeling,” *J. Acous. Soc. Am.*, vol. 107, no. 5, Pt. 2, p. 2897, May 2000 (139th Acoustical Society of America Meeting).
- [452] X. M. Xu and Q. H. Liu, “The CG-NUFFT method for the solution of integral equations,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [453] Q. H. Liu and G.-X. Fan, “Simulation of GPR measurements in dispersive media with the PSTD algorithm,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [454] Z. Q. Zhang and Q. H. Liu, “Hybridization of the extended Born approximation and CG-FFHT method,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [455] G.-X. Fan and Q. H. Liu, “A fast Fourier transform algorithm for functions with jump discontinuities,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [456] Q. H. Liu and Z. Q. Zhang, “A novel nonlinear inversion of borehole induction measurements,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [457] Q. H. Liu and G.-X. Fan, “Recent advances in the PSTD algorithm for large-scale problems,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [458] Y. Zeng and Q. H. Liu, “Poroelastic wave propagation for acoustic landmine detection,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [459] B. K. Sinha, Q. H. Liu, T. J. Plona, and K. W. Winkler, “A finite-difference formulation of borehole wave propagation in prestressed formation,” Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [460] Z. Q. Zhang, and Q. H. Liu, “Nonlinear inversion of borehole induction measurements using a new fast forward algorithm,” 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [461] G.-X. Fan, Q. H. Liu, “An improved pseudospectral time-domain method for perfect conductors,” 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [462] B. Tian, and Q. H. Liu, “Comparison of two Chebyshev PSTD algorithms for inhomogeneous media,” 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [463] G.-X. Fan, Q. H. Liu, and X. M. Xu, “Reduction of sampling density in CGFFT method: Application of FFT algorithm for discontinuous functions,” 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [464] R. Duraiswami, L. Davis, S. A. Shamma, H. C. Elman, R. O. Duda, V. R. Algazi, Q. H. Liu, S. T. Raveendra, “Individualized HRTFs using computer vision and computational acoustics,” *J. Acous. Soc. Am.*, vol. 108, no. 5, pt. 2, p. 2597, Nov. 2000 (140th Acoustical Society of America Meeting, Newport Beach, CA).
- [465] Q. H. Liu, and G.-X. Fan, “A systematic method for unsplit PML and applications in FDTD and PSTD methods,” Invited Talk, 2001 URSI Intl. Symp. Electromag. Theory, Victoria, Canada, May 2001.
- [466] T. Xiao, and Q. H. Liu, “Finite-difference computation of head-related transfer functions for human hearing,” 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [467] Y. Q. Zeng, and Q. H. Liu, “3D multidomain PSTD for elasticity,” 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [468] Y. Q. Zeng, and Q. H. Liu, “Acoustic landmine detection: Poroelastic model and elastic wave models,” 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [469] Y. Q. Zeng, Z. Q. Zhang, and Q. H. Liu, “Active ultrasound imaging of breast tumors: Forward and inverse scattering methods,” 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [470] Q. H. Liu, X. Xu, Z. Q. Zhang, G. Zhao, “Strategy for modeling objects obstructed by foliage above a penetrable ground: spectral and higher-order methods,” 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [471] Q. H. Liu, and Z. Q. Zhang, “3-D microwave imaging for biomedical applications: numerical simulations,” 2001 URSI Meeting Abstract, Boston, MA, June 2001.

- [472] Q. H. Liu, and G. Zhao, "Multidomain pseudospectral time-domain method for 2.5-D problems," 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [473] Z. Q. Zhang, and Q. H. Liu, "Reconstruction of 3D lossy media by using microwave measurements," 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [474] X. M. Xu, and Q. H. Liu, "A fast numerical method for electromagnetic scattering from inhomogeneous objects in layered medium," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [475] Q. H. Liu, "A pseudospectral frequency-domain algorithm for computational electromagnetics," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [476] G. Zhao, and Q. H. Liu, "A 3-D multidomain pseudospectral time-domain algorithm," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [477] T. Xiao, and Q. H. Liu, "An embedded technique for a highly accurate FDTD method," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [478] Z. Q. Zhang, and Q. H. Liu, "Fast AIM computation of EM fields from 3D inhomogeneous objects," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [479] I. Deshmukh, and Q. H. Liu, "Pseudospectral-beam propagation method (PS-BPM) for optical waveguides," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [480] Z. Q. Zhang, and Q. H. Liu, "3D EM induction imaging for buried object detection and identification," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [481] Z. Q. Zhang, and Q. H. Liu, "3-D fast forward and inverse methods for subsurface electromagnetic induction sensing," Progress in Electromagnetics Research Symposium, Boston, MA, July 2002.
- [482] Z. Q. Zhang, and Q. H. Liu, "FFT-accelerated fast forward and inverse scattering methods for microwave imaging of breast cancer," Progress in Electromagnetics Research Symposium, Boston, MA, July 2002.
- [483] Q. H. Liu, and L. Carin, "A GPR subsystem suitable for integration with EMI/NQR sensors," UXO / Countermines Forum, Orlando, FL, Sept. 2002.
- [484] Z. Q. Zhang, and Q. H. Liu, "A new method for target detection and discrimination: 3-D inverse scattering," UXO/Countermines Forum, Orlando, FL, Sept. 2002.
- [485] Z. Q. Zhang, and Q. H. Liu, "Target detection and discrimination using 3-D inverse scattering methods," *Proc. SPIE*, Orlando, FL, April 2003.
- [486] M. Chai, and Q. H. Liu, "Efficient 3-D ground penetrating radar simulation with spiral antennas and buried objects," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [487] J. Liu, and Q. H. Liu, "A fast simulation method for 3D photonic crystals," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [488] I. Deshmukh, and Q. H. Liu, "Pseudospectral beam propagation method and finite element method: A hybrid technique in computational photonics," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [489] X. Millard, and Q. H. Liu, "The BCGS-FFT method for 3-D objects in subsurface layered media," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [490] Z. Q. Zhang, and Q. H. Liu, "A fast 3-D inverse scattering method for objects in layered media," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [491] T. Xiao, and Q. H. Liu, "Staggered upwind embedded boundary method for 3D Maxwell's equations," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [492] T. Xiao, and Q. H. Liu, "Spectral methods in general curvilinear simplex grids," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [493] G. Zhao, and Q. H. Liu, "A penalty method for multidomain pseudospectral time-domain (PSTD) algorithm," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [494] M. Chai, and Q. H. Liu, "An Embedded Boundary Method to Eliminate the ADI-FDTD Staircasing Error," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [495] Q. H. Liu, F. Li, and L.-P. Song, "Joint Electromagnetic/Acoustic Reconstruction of Underground Structures," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [496] J. Liu, and Q. H. Liu, "A High-Order Integral Equation Method for Non-Smooth Objects," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [497] J. Song, and Q. H. Liu, "2D Nonuniform Fast Fourier Transform (NUFFT) Method for Synthetic Aperture Radar and Ground Penetrating Radar Signal Processing," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [498] J.-H. Lee, and Q. H. Liu, "Analysis of 3D Eigenvalue Problems Based on a Spectral Element Method," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [499] L.-P. Song, Q. H. Liu, and F. Li, "Hybrid Extended Born Approximation and Contrast Source Inversion for 3-D Inversion in Layered Media," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.

- [500] G. Shi, K. H. Lim, J. Di Sarro, J. Hu, R. T. George, G. Ybarra, W. T. Joines, and Q. H. Liu “A 2-D Electrical Impedance Tomography System and Image Reconstruction,” 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [501] E. Simsek, Q. H. Liu, and J. Liu, “Fast Computation of Green’s Functions for Layered Media and Its Application in Interconnect Simulations,” 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [502] T. Xiao, and Q. H. Liu, “An Efficient and Flexible Pseudospectral Time-Domain (PSTD) Method for Maxwell’s Equations,” 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [503] T. Xiao, and Q. H. Liu, “A 3D Spectral Discontinuous Galerkin Method with Hybrid Elements,” 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [504] G. Zhao, and Q. H. Liu, “A New Pseudospectral Time-Domain (PSTD) Algorithm Based on Discontinuous Galerkin Method (DGM) and Hexahedral Elements,” 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [505] G. Zhao, and Q. H. Liu, and S. A. Wartenberg, “Application of the 2.5-D Pseudospectral Time-Domain (PSTD) Algorithm to Eccentric Waveguide Analysis,” 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [506] Q. H. Liu, F. Li, and L.-P. Song, “Multimodality Inversion for Image Reconstruction of Objects Buried in Multilayered Media with Radar and Seismic Measurements,” Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [507] Q. H. Liu, L.-P. Song, X. Millard, and F. Li, “Fast Forward and Inverse Scattering Methods for 3D Objects Buried in Multilayered Media,” Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [508] Q. H. Liu, and J. Liu, “A Spectral Integral Method (SIM) for the Scattering of Periodic and Nonperiodic Structures,” Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [509] Q. H. Liu, T. Xiao, and G. Zhao, “Spectral and High-Order Time-Domain Methods for Transient Electromagnetics,” Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [510] C. Cheng, Q. H. Liu, J. H. Lee, and H. Z. Massoud, “Spectral element method for the Schrödinger-Poisson system,” International Workshop on Computational Electronics 10, Oct. 24-27, 2004, Purdue University, West Lafayette, Indiana, USA.
- [511] B. J. Wei, and Q. H. Liu, “Reconstruction of 3-D objects in layered media with arbitrary source and receiver locations,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [512] G. Ye, Q. H. Liu, K. H. Lim, K. McCarter, R. George, G. Ybarra, W. T. Joines, “A 3-D EIT System for Breast Cancer Detection,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [513] J.-H. Lee, and Q. H. Liu, “A Spectral Element Method with High-Order Geometrical Modeling for 3-D Electromagnetic Fields,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [514] J.-H. Lee, and Q. H. Liu, “A Mesh Generator for the SEM and PSTD Methods,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [515] J. Liu, and Q. H. Liu, “A Hybrid FEM/SIM Method for Electromagnetic Scattering from Objects with an Exact Radiation Boundary Condition,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [516] J. Liu, E. Simsek, and Q. H. Liu, “Fast Simulation of Periodic Structures in a Layered Medium,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [517] J. Song, and Q. H. Liu, “3D Non-Uniform Fast Fourier Transform (NUFFT) Based Migration for Sub-surface Object Imaging,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [518] J. Song, and Q. H. Liu, “A Novel Medical Ultrasound Image Reconstruction Method Through Migration,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [519] M. Chai, G. Zhao, and Q. H. Liu, “A Hybrid Technique Combining PSTD, ADI, and FDTD Methods for Mixed Scale Problems,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [520] D. Liu, G. Kang, J. Krolik, Q. H. Liu, L. Carin, “Electromagnetic Time Reversal Imaging and Communications,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [521] T. Xiao, and Q. H. Liu, “Time-Domain Simulation of Negative Refractive Index Materials,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [522] T. Xiao, and Q. H. Liu, “An Enlarged Cell Technique for the Conformal FDTD Method to Model Perfectly Conducting Objects,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [523] J. Liu, and Q. H. Liu, “A Hybrid FEM/SIM Method for Electromagnetic Scattering from Objects with an Exact Radiation Boundary Condition,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [524] E. Simsek, J. Liu, and Q. H. Liu, “A Spectral Integral Method for Layered Media,” 2005 URSI Meeting Abstract, Washington, DC, July 2005.

- [525] T. Xiao, Q. H. Liu, Y. Chen, W. T. Joines, S. A. Wartenberg, and L. Carin, "Design of a Resistively-Loaded Printed Vee Antenna for Ground Penetrating Radars Using ECT-CFDTD Method," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
- [526] T. Xiao, M. Chai, and Q. H. Liu, "A Hybrid Time-Domain Method for Electromagnetic Problems in Microelectronic Packaging," PIERS'97, Boston, MA, March 2006.
- [527] J. Liu, J. -H. Lee, E. Simsek, and Q. H. Liu, "A Hybrid Spectral Integral Method/spectral Element Method for Electromagnetic Wave Scattering," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [528] T. Xiao, and Q. H. Liu, "A Flexible Multiscale Technique for Electromagnetic Simulation," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [529] K. H. Lim, and Q. H. Liu, "Thermoacoustic tomography modeling with spectral element method," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [530] C. Yu, E. Simsek, and Q. H. Liu, "Accurate Simulation of Electromagnetic Waves Scattered by 3D Objects in a Multilayered Medium by a Surface Integral Equation Method," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [531] J. Liu, E. Simsek, and Q. H. Liu, "A 3-D Spectral Integral Method for Acoustic and Electromagnetic Wave Scattering," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [532] K. H. Lim, G. Ye, and Q. H. Liu, "3D EIT Forward and Inverse Modeling," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [533] C. Yu, B. Wei, and Q. H. Liu, "Tunnel Detection and Imaging: 2D and 3D Forward and Inverse Solvers," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [534] E. Simsek, J. Liu, and Q. H. Liu, "A 2D Hybrid Spectral-Integral/Finite-Element Method for Layered Media," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [535] J. -H. Lee, T. Xiao, and Q. H. Liu, "A Discontinuous Spectral Element Time-Domain Method for Electromagnetic Devices," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [536] T. Xiao, J. Guo, and Q. H. Liu, "Nanophotonics Application of 3D Spectral Discontinuous Galerkin Method and Enlarged Cell Technique," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [537] J. -H. Lee, and Q. H. Liu, "A 3-D Spectral Element Time-Domain (SETD) Method for Electromagnetic Wave Problems," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [538] M. Chai, T. Xiao, G. Zhao, and Q. H. Liu, "A Hybrid PSTD/FDTD Method for Multiscale Problems," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [539] M. Chai, T. Xiao, and Q. H. Liu, "Large EMI/EMC Simulations with the Hybrid PSTD/FDTD Method," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [540] E. Simsek, J. Liu, and Q. H. Liu, "A 3D Spectral Integral Method for Layered Media," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [541] Q. H. Liu, C. Yu, J. Stang, M. Yuan, E. Bresslour, R. T. George, G. Ybarra, and W. T. Joines, "Experimental and Numerical Investigations of a High-Resolution 3D Microwave Imaging System for Breast Cancer Detection," 2007 URSI Meeting Abstract, Honolulu, HI, June 2007.
- [542] J. -H. Lee, and Q. H. Liu, "Nanophotonic Applications of the Discontinuous Spectral Element Time-Domain (DG-SETD) Method," 2007 URSI Meeting Abstract, Honolulu, HI, June 2007.
- [543] J. Liu, Y. Lin, J. -H. Lee, E. Simsek, and Q. H. Liu, "Application of the hybrid spectral integral method with spectral element method," 2007 URSI Meeting Abstract, Honolulu, HI, June 2007.
- [544] M. Chai, and Q. H. Liu "A Hybrid PSTD-FDTD Method for Indoor Wireless Communication Systems," 2007 URSI Meeting Abstract, Honolulu, HI, June 2007.
- [545] Q. H. Liu, and J. H. Lee, "Discontinuous spectral element time-domain (DG-SETD) method for nanophotonics," The International Conference On Spectral and High Order Methods (ICOSAHOM) 2007, Beijing, China, June 18-22, 2007.
- [546] T. Xiao, and Q. H. Liu, "An Enlarged Cell Technique for the Conformal FDTD Method in Complex Engineering Applications," The International Conference On Spectral and High Order Methods (ICOSAHOM) 2007, Beijing, China, June 18-22, 2007.
- [547] J. Chen, J.-H. Lee, and Q. H. Liu, "A Symplectic Runge-Kutta Scheme for Spectral-Element Time-Domain Method in Electromagnetic Simulation," URSI Meeting, Boulder, CO, Jan. 2008.
- [548] Q. H. Liu, "Hybrid Computational EM Methodologies and Their Applications in EMC," (Invited Plenary Paper), 2008 International Symposium on Electromagnetic Compatibility Technology, Wuhan, China,
- [549] Y. Lin, J. Liu, J.-H. Lee, and Q. H. Liu, "A Novel Hybrid SIM-SEM Method for 3D Electromagnetic Scattering Problems," URSI Meeting, Boulder, CO, Jan. 2008.

- [550] T. Xiao, M. Yuan, J.-H. Lee, Q. H. Liu, "Introduction of an ECT Simulator for Microelectronic Packaging," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 2008.
- [551] Q. H. Liu, C. Yu, J. Stang, M. Yuan, R. T. George, G. A. Ybarra, and W. T. Joines, "Progress of a High-Resolution 3-D Microwave Imaging System for Breast Cancer Detection," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 2008.
- [552] Q. H. Liu, Y. Lin, C. Yu, J.-H. Lee, J. Liu, and E. Simsek, "Fast CEM Solvers Based on Volume and Surface Integral Equations," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 2008.
- [553] C. Yu, M. Yuan, Q. H. Liu, J. Stang, Y. Zhang, R. T. George, G. A. Ybarra, and W. T. Joines, "Microwave Imaging for Targets in Layered Media: Image Reconstruction from Experimental Data," URSI Meeting, San Diego, CA, July 2008.
- [554] J. Chen, M. Chai, J. A. Mix, and Q. H. Liu, "High-Order Full Vectorial Finite Element Method and Its Application in Analyzing Printed Circuit Board with Microstrips and Striplines," URSI Meeting, San Diego, CA, July 2008.
- [555] J. Chen, J.-H. Lee, and Q. H. Liu, "A Novel Time Integration Scheme with High Precision for Spectral-Element Time-Domain Method in Electromagnetic Simulation," URSI Meeting, San Diego, CA, July 2008.
- [556] M. Yuan, C. Yu, J. Stang, R. T. George, G. A. Ybarra, W. T. Joines, Q. H. Liu, "Experiments and Simulations of an Antenna Array for Biomedical Microwave Imaging Applications," URSI Meeting, San Diego, CA, July 2008.
- [557] Y. Liu, Z. Nie, Q. H. Liu, "Synthesis of nonuniform linear antenna arrays by the matrix pencil method," URSI Meeting, San Diego, CA, July 2008.
- [558] Y. Lin, J.-H. Lee, J. Liu, and Q. H. Liu, "Hybrid SIM-SEM Method with High Order Mixed-Order Curl Conforming Vector Basis Functions for Scattering Problems," URSI Meeting, San Diego, CA, July 2008.
- [559] G. P. Chen, W. B. Yu, Z. Q. Zhao, Z. P. Nie, Q. H. Liu, "The application of time reversal mirror based on pseudo-spectrum time domain for microwave-induced thermo-acoustic tomography," IEEE APS and URSI Meeting, San Diego, CA, July 2008.
- [560] J. Chen, B. Zhu, W. Zhong, and Q. H. Liu, "A semi-analytical vector spectral element method and its application to waveguide discontinuity problems," URSI Meeting, Boulder, CO, Jan. 2009.
- [561] B. Zhu, J. Chen, W. Zhong, and Q. H. Liu, "A quasi non-overlapping hybrid finite-element/finite-difference time-domain technique," URSI Meeting, Charleston, SC, June 2009.
- [562] J. Chen, B. Zhu, M. Chai, J. A. Mix, and Q. H. Liu, "A spurious-free 3D discontinuous Galerkin finite-element time-domain method," URSI Meeting, Charleston, SC, June 2009.
- [563] J. Chen, B. Zhu, W. Zhong, and Q. H. Liu, "A semi-analytical finite element method with the perfectly matched layer for the analysis of discontinuities in open waveguide-like structures," URSI Meeting, Charleston, SC, June 2009.
- [564] J. Chen, J.-H. Lee, and Q. H. Liu, "A non-spurious vector spectral element method for Maxwell's equations," URSI Meeting, Charleston, SC, June 2009.
- [565] X. Rui, J. Hu, and Q. H. Liu, "Scattering from PEC body of revolution with fast multipole method," URSI Meeting, Charleston, SC, June 2009.
- [566] Y. Liu, Z. Nie, and Q. H. Liu, "A new accurate algorithm for the evaluation of discontinuous fast Fourier transform integral (DIFFT)," URSI Meeting, Charleston, SC, June 2009.
- [567] Y. Liu, Z. Nie, and Q. H. Liu, "Optimization of nonuniform fast Fourier transform (NUFFT) for improved accuracy and efficiency," URSI Meeting, Charleston, SC, June 2009.
- [568] Q. H. Liu, B. K. Sinha, and E. Simsek, "Time-domain numerical models for acoustoelasticity in multi-dimensional inhomogeneous media," invited, URSI Meeting, Charleston, SC, June 2009.
- [569] C. Yu, M. Yuan, and Q. H. Liu, "Reconstruction of 3-D dielectric objects from measured data," invited, URSI Meeting, Charleston, SC, June 2009.
- [570] M. Luo, Q. H. Liu, and Z. Li, "2D Green's function tensor and projected local density of state in dispersive and anisotropic photonic crystals," URSI Meeting, Charleston, SC, June 2009.
- [571] M. Luo, Q. H. Liu, and Z. Li, "A spectral element method for band structures of 2-D anisotropic photonic crystals," invited, URSI Meeting, Charleston, SC, June 2009.
- [572] Q. H. Liu, J. Chen, T. Xiao, J.-H. Lee, M. Yuan, "Discontinuous Galerkin Time Domain Method for Multiscale Microelectronic Packaging," PIERS'2010, Boston, MA, July 2010.
- [573] M. Yuan, and Q. H. Liu, "3-D Microwave Imaging in a Non-Canonical Inhomogeneous Background," PIERS'2010, Boston, MA, July 2010.

- [574] M. Luo, and Q. H. Liu, "Spectral Element Method for 2-D and 3-D Photonic Crystals with Dispersive and Anisotropic Materials," PIERS'2010, Boston, MA, July 2010.
- [575] L. Wang, and Q. H. Liu, "A Multi-Band Integrated Antenna Subsystem for Smartbook and Smartpad Applications," URSI Meeting, Toronto, Canada, July 2010.
- [576] L. Wang, and Q. H. Liu, "A Dual-Frequency Printed Electrically Small Antenna Unit," URSI Meeting, Toronto, Canada, July 2010.
- [577] X. Rui, J. Hu, and Q. H. Liu, "Scattering from a Composite Body of Revolution with Fast Inhomogeneous Plane Wave Algorithm," URSI Meeting, Toronto, Canada, July 2010.
- [578] J. Chen, and Q. H. Liu, "A Hybrid Spectral-Element / Finite-Element Method with the Implicit-Explicit Runge-Kutta Scheme for Multiscale Computation," URSI Meeting, Toronto, Canada, July 2010.
- [579] X. Rui, J. Hu, and Q. H. Liu, "Hybrid Finite Element Method and Boundary Integration Method for an Inhomogeneous Body of Revolution," URSI Meeting, Toronto, Canada, July 2010.
- [580] Y. Lin, Q. H. Liu, "A Non-Overlapping Non-Conforming Domain Decomposition Method Based on FEM and SEM for 3D Helmholtz Equation," URSI Meeting, Toronto, Canada, July 2010.
- [581] Y. Lin, Q. H. Liu, M. Chai, and J. A. Mix, "A Hybrid SEM/FEM Domain Decomposition Method Combined with the Spectral Integral Method for Multi-Scale Problems," URSI Meeting, Toronto, Canada, July 2010.
- [582] J. Chen, J. A. Mix, M. Chai, and Q. H. Liu, "An Adaptive Localized Time Stepping Scheme for Discontinuous Galerkin Finite Element Time Domain Method," URSI Meeting, Toronto, Canada, July 2010.
- [583] J. Chen, Y. Huang, and Q. H. Liu, "A Time-Parallel High Precision Integration Scheme for Wideband Electromagnetic Analysis," URSI Meeting, Toronto, Canada, July 2010.
- [584] Q. H. Liu, "Subsurface and Biomedical Sensing and Imaging: Application of Computational Acoustics and Electromagnetics," (Invited Plenary Speech), 10th Intl. Conf. Theoretical Computat. Acoust., April 2011.
- [585] Z. Liu, J. Yang, X. Zhang, Q. H. Liu, "Nonlinear RCM compensation method for spaceborne/airborne forward-looking bistatic SAR," URSI Meeting, Spokane, WA, July 2011.
- [586] Y.-J. Ren, L. Wang, C.-H. Ahn, Q. H. Liu, and K. Chang, "Design of X-Band Wideband Linear Antenna Array with Reduced Number of Antenna Elements," URSI Meeting, Spokane, WA, July 2011.
- [587] M. Luo, and Q. H. Liu, "Finite Periodic Woodpile Photonic Crystal Simulated by Domain Decomposition Spectral Element Method," URSI Meeting, Spokane, WA, July 2011.
- [588] M. Luo, and Q. H. Liu, "Enhanced Scattering by a Slab of Periodic Photonic Crystal with Strongly Dispersive Materials," URSI Meeting, Spokane, WA, July 2011.
- [589] L. Wang, and Q. H. Liu, "Microstrip Patch Antenna Miniaturization Using the Impedance-Matched Magneto-Dielectric Substrate," URSI Meeting, Spokane, WA, July 2011.
- [590] J. Chen, L. Tobon, and Q. H. Liu, "An Implicit Discontinuous Galerkin Finite-Element Time-Domain Method with Block Thomas Algorithm for Layered Electrically Small Structures," URSI Meeting, Spokane, WA, July 2011.
- [591] Z. Yu, Q. H. Liu, M. Chai, J. Mix, and K. Slattery, "Inverse Source Solver for Current Reconstruction with High Resolution," URSI Meeting, Spokane, WA, July 2011.
- [592] L. Tobon, J. Chen, and Q. H. Liu, "Modal Analysis of Spectral Element Method Based on Rayleigh Quotient," URSI Meeting, Spokane, WA, July 2011.
- [593] Y. Huang, Q. H. Liu, and J. Zhang, "A Bilinear Algorithm for Three-Dimensional GPR Forward Scattering Based on Wideband Diagonal Tensor Approximation," URSI Meeting, Spokane, WA, July 2011.
- [594] L. Wang, and Q. H. Liu, "Nonlinear Memristors Loaded Circular Loop Antenna," URSI Meeting, Spokane, WA, July 2011.
- [595] M. Luo, and Q. H. Liu, "Spectral Element Method for Photonic Crystal Consisting of Dispersive and Non-Dispersive Materials," URSI Meeting, Spokane, WA, July 2011.
- [596] J. Chen, L. Tobon, and Q. H. Liu, "A Memory-Efficient Discontinuous Galerkin Finite-Element Time-Domain Method for Finite Periodic Structures," URSI Meeting, Spokane, WA, July 2011.
- [597] J. Chen, L. Tobon, and Q. H. Liu, "Hamiltonian Analysis of Wave Ports and Its Application in Transient Simulations in Electronic Packages," URSI Meeting, Spokane, WA, July 2011.
- [598] Y. Huang, J. Zhang, and Q. H. Liu, "Modified Diagonal Tensor Approximation Algorithm for Three-dimensional GPR Forward Scattering," PIERS'97, Suzhou, China, Sept. 2011.
- [599] Y. Huang, J. Zhang, and Q. H. Liu, "Fast Three-dimensional GPR Backward Scattering Based on Wideband Diagonal Tensor Approximation," PIERS'97, Suzhou, China, Sept. 2011.

- [600] M. Luo, and Q. H. Liu, "Electromagnetic scattering of finite size periodic large scale system: simulation by domain decomposition spectral element method," 11th International Workshop on Finite Elements for Microwave Engineering - FEM2012, June 4-6, 2012, Estes Park, Colorado.
- [601] M. Luo, and Q. H. Liu, "Enhancement of second-harmonic generation in an air-bridge photonic crystal slab: simulation by spectral element method," 11th International Workshop on Finite Elements for Microwave Engineering - FEM2012, June 4-6, 2012, Estes Park, Colorado.
- [602] L. E. Tobon, and Q. H. Liu, "Study of Numerical Dispersion for Quadrilateral and Triangular Elements in the Mixed Finite Element Method," 11th International Workshop on Finite Elements for Microwave Engineering - FEM2012, June 4-6, 2012, Estes Park, Colorado.
- [603] L. E. Tobon, and Q. H. Liu, "New Spectral-Prism-Element for Layered Structures Implemented in an Efficient Implicit DG-FETD Method," 11th International Workshop on Finite Elements for Microwave Engineering - FEM2012, June 4-6, 2012, Estes Park, Colorado.
- [604] B. Zhu, J. Chen, W. Zhong, and Q. H. Liu, "Hybrid FETD/FDTD Techniques Based on the Discontinuous Galerkin Method," 11th International Workshop on Finite Elements for Microwave Engineering - FEM2012, June 4-6, 2012, Estes Park, Colorado.
- [605] M. Luo, and Q. H. Liu, "Enhancement of Second Harmonic Generation in an Air-Bridge Photonic Crystal Slab: Simulation by Spectral Element Method," URSI Meeting, Chicago, IL, July 2012.
- [606] Z. Yu, M. Chai, J. A. Mix, K. P. Slattery, and Q. H. Liu, "Inverse Source Solver with Phaseless Field Data Compatibility for High Resolution Near Field Scanner," URSI Meeting, Chicago, IL, July 2012.
- [607] W. Zhang, and Q. H. Liu, "Simultaneous Reconstruction of Dielectric and Magnetic Contrasts in Axisymmetric Inhomogeneous Media," URSI Meeting, Chicago, IL, July 2012.
- [608] Z. Yu, X. Rui, J. Hu, and Q. H. Liu, "Hybrid Finite Element Method and Boundary Integration Method for an Anisotropic Body of Revolution," URSI Meeting, Chicago, IL, July 2012.
- [609] Q. H. Liu, W. Zhang, M. Yuan, G. Ye, G. Chen, X. Zhu, and Z. Zhao, "Electromagnetic and Acoustic Inverse Scattering and Imaging in Complex Environments: Some Recent Progress," URSI Meeting, Chicago, IL, July 2012.
- [610] W. Zhang, A. Hoorfar, and Q. H. Liu, "Three-Dimensional Real-Time Through-the-Wall Imaging," URSI Meeting, Chicago, IL, July 2012.
- [611] Q. Ren, L. E. Tobon, and Q. H. Liu, "A New Non-Spurious Discontinuous Galerkin Finite-Element Time Domain Method," URSI Meeting, Chicago, IL, July 2012.
- [612] W. Zhang, A. Hoorfar, and Q. H. Liu, "Three-Dimensional Imaging of Targets Behind Multilayered Walls," URSI Meeting, Chicago, IL, July 2012.
- [613] Q. H. Liu, "Spectral Element Method for Nanophotonics," Cross-Strait Computational Mathematics Workshop, Kaohsiung, Taiwan, July 26-30, 2012.
- [614] Q. H. Liu, "Multiscale Computational Electromagnetics: Applications in Design Optimization, Sensing and Imaging," Invited Plenary Speech, Annual Conference of Chinese Computational Physics, Harbin, China, Aug. 12-15, 2012.
- [615] Q. H. Liu, "Spectral Element Method (SEM) for Nanoelectronics and Nanophotonics," Invited Plenary Speech, 2nd Annual World Congress of Nano-S&T (Nano S&T-2012), Qingdao, China, October 26-28, 2012.
- [616] Q. H. Liu, "Progress in multiscale computational electromagnetics in time Domain," Pulsed Electromagnetic Fields: Their Potentialities, Computation and Evaluation, Delft, the Netherlands, March 2013.
- [617] M. Luo, and Q. H. Liu, "Huge Enhancement of Second-Harmonic Generation in Air-Bridge Photonic Crystal Slabs," PIERS, Taipei, Taiwan, April 2013.
- [618] Q. H. Liu, M. Yuan, J.-H. Lee, B. Zhao, "SPICE with Multiple EM Solvers for Multiscale Field-Circuit Coupling," 2013 Workshop on Electromagnetic Theory, Modeling and Simulations, Chengdu, China, June 2013.
- [619] Z. Yu, M. Chai, J. Mix, K. Slattery, Q. H. Liu, "An Iterative Least-Square Based Technique for High Resolution Source Reconstruction with Phaseless Near Field Scan Data," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [620] L. E. Tobon, Q. Ren, Q. H. Liu, "A new efficient non-spurious 3D DG-FETD for large and multiscale electromagnetic systems," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [621] L. E. Tobon, Q. H. Liu, "New efficient and naturally parallelizable time integration algorithm applied to sequential domains for DG-TD," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [622] J. Dai, Q. H. Liu, "Fast Computation of Electromagnetic Fields in Anisotropic Media Layered Both Vertically and Cylindrically Using the Numerical Mode Matching (NMM) Method," IEEE APS/URSI Meeting, Orlando, FL, July 2013.

- [623] J. Wang, Z. Zhao, J. Wu, K. Yang, Z. Nie, Q. H. Liu, "Electromagnetic Inverse Scattering Series (ISS) Method for Sensing 2-D Objects Buried in Layered Media with Unknown Dielectric Properties," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [624] C. Qi, Z. Zhao, K. Yang, Z. Nie, Q. H. Liu, "Scattering and Doppler Spectral Analysis for a Flying Target Above a 3-D Sea Surface," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [625] X. Zhu, Z. Zhao, K. Yang, J. Wu, Q. H. Liu, "A Scaled Experimental System for Underwater Seismic Imaging and Exploration," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [626] J. Song, Z. Zhao, J. Wu, X. Zhu, Z. Nie, Q. H. Liu, "Thermo-Acoustic Imaging for Different Breast Tissues in Microwave Induced Thermo-Acoustic Tomography System," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [627] K. Xu, Y. Zhang, W. T. Joines, Q. H. Liu, Y. Fan, "Microstrip Multi-Band Bandpass Filters Using a Single Improved Ring Resonator," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [628] K. Yang, Z. Zhao, X. Zhu, Q. H. Liu, "Robust Adaptive Beamforming with Low Sidelobe Levels," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [629] T. Tan, Q. H. Liu, "Unconditionally Stable Locally Tridiagonal Iterative FDTD for High Loss Applications," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [630] Y. Zhang, M. Yuan, Q. H. Liu, "An Impulse Electromagnetic Interference Shielding Based on a Diode Grid," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [631] W. Zhang, Q. H. Liu, "Nanoparticles for Electromagnetic Fields Enhancement in Cross Well Imaging of Subsurface," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [632] Z. Yu, W. Zhang, Q. H. Liu, "A Three-Dimensional BCGS-FFT Method for Inhomogeneous Anisotropic Scatterers with High Dielectric and Magnetic Contrasts," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [633] K. Yang, Z. Zhao, X. Zhu, Q. H. Liu, "Resolving Ambiguities in DOA Estimation by Optimizing the Element Orientations," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [634] L. Wang, Q. H. Liu, W. T. Joines, M. Q. Yuan, "Magnetic Antenna Based on Two Dimensional DC Superconducting Quantum Interference Filter," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [635] L. Wang, Q. H. Liu, W. T. Joines, M. Q. Yuan, "Two Dimensional DC Superconducting Quantum Interference Filter Framework," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [636] N. Liu, Y. Tang, X. Zhu, L. E. Tobon, Q. H. Liu, "Higher-order Mixed Spectral Element Method for Maxwell Eigenvalue Problem," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [637] J. Wu, Z. Zhao, J. Song, X. Zhu, Z. Nie, Q. H. Liu, "A Wideband Printed Antenna with Unidirectional Radiation Characteristics," IEEE APS/URSI Meeting, Orlando, FL, July 2013.
- [638] M. Luo, and Q. H. Liu, "Nonlinear and Quantum Optics with the Spectral Element Method," PIERS, Stockholm, Sweden, August 2013.
- [639] Q. H. Liu, Z. Zhao, X. Zhu, Z. Yu, and W. Zhang, "Progress and Challenges in Microwave Imaging and Microwave Induced Thermoacoustic Tomography," IEEE IMWS-Bio 2013, Singapore, Dec. 2013.
- [640] Q. H. Liu, "Some Computational Problems in Seismic Imaging and Acoustic Well Logging," 2014 National Reservoir Acoustics and Well Logging Workshop, Beijing, July 2014.
- [641] Q. H. Liu, "Multiscale Computational Electromagnetics for Applications in Subsurface Sensing, Microwaves, and Nanophotonics," 2014 Asia-Pacific Conference on Antennas and Propagation (APCAP 2014), Harbin, July 2014.
- [642] Q. H. Liu, Q. Ren, L. Tobon, Q. Sun, "New Discontinuous Galerkin SETD and FETD Methods for Multiscale Electromagnetics," FEM2014, Chengdu, May 2014.
- [643] K. Xu, Y. Zhang, W. T. Joines, and Q. H. Liu, "Compact Planar Antenna for Triple Frequency Band Operation," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [644] K. Xu, Y. Zhang, W. T. Joines, and Q. H. Liu, "Planar Interdigital-Coupled UWB Bandpass Filter with a Notched Band," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [645] H. Yang, T. Li, Z. He, and Q. H. Liu, "Design and Analysis of An Impulse Borehole Radar for Well Logging," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [646] J. Liu, Z. Zhao, K. Yang, and Q. H. Liu, "Sum and Difference Pattern Synthesis with Antenna Correction," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [647] Z. Yu, W. Zhang, J. Zhou, and Q. H. Liu, "Application Of Mixed Order BCGS-FFT On Contrast Enhanced Oil Reservoir Imaging," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [648] Z. Yu, W. Zhang, and Q. H. Liu, "Mixed Order Integral Equation Formulation For the Scattering From Large Inhomogeneous Anisotropic Magnetodielectric Objects," IEEE APS/URSI Meeting, Memphis, TN, July 2014.

- [649] Q. Ren, L. Tobon, Q. Sun, and Q. H. Liu, "The Hybrid SETD-FETD Method with Field Variables E and B," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [650] Q. Ren, and Q. H. Liu, "New DG-SETD Method for 3D EM Simulations," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [651] Q. Sun, and Q. H. Liu, "A new DG-FETD implicit time stepping scheme based on E and B fields for sequentially ordered systems," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [652] J. Niu, M. Luo, and Q. H. Liu, "Boundary Integral Spectral Element Method for Extreme Ultraviolet Multilayer Defects Analyses," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [653] Y. Hu, W. Zhang, and Q. H. Liu, "Multiphysics coupling of dynamic fluid flow and electromagnetic fields for subsurface sensing," IEEE APS/URSI Meeting, Memphis, TN, July 2014.
- [654] S. Lei, Z. Zhao, Z.-P. Nie, and Q. H. Liu, "Adaptive Optimal Polarization Detection of Target in Clutter Background Based on Generalized Rayleigh Quotient," PIERS, Guangzhou, August 2014.
- [655] Q. H. Liu, W. Zhang, Z. Yu, Y. Hu, and Y. Fang, "Fast Forward and Inverse Solution Methods for Magnetodielectric Materials," PIERS, Guangzhou, August 2014.
- [656] S. Wu, J. Zhu, J. Li, Y. Bai, and Q. H. Liu, "Optical Transmission through Ultrathin Metal Films with Sub-wavelength Hole Arrays: Experiments and Simulations," PIERS, Guangzhou, August 2014.
- [657] J. Wang, Z. Zhao, Z.-P. Nie, and Q. H. Liu, "Subsurface Imaging 3-D Objects in Multilayered Media by Using Electromagnetic Inverse Scattering Series Method (EISSM)," PIERS, Guangzhou, August 2014.
- [658] N. Feng, Y. Yue, C. Zhu, and Q. H. Liu, "Effective Implementation of the CFS-PML Using DSP Techniques for Truncating Dispersive Medium FDTD Domains," PIERS, Guangzhou, August 2014.
- [659] Q. H. Liu, Q. Ren, Q. Sun, and L. E. Tobon, "Some Recent Progress on the Discontinuous Galerkin Time Domain Method for Multiscale Electromagnetics," PIERS, Guangzhou, August 2014.
- [660] L. Ye, L. Zhang, Y. Liu, and Q. H. Liu, "Enhancement of Terahertz Surface Plasmon Polaritons Using Tapered Graphene Waveguide," PIERS, Guangzhou, August 2014.
- [661] L. Zhang, L. Ye, Y. Liu, and Q. H. Liu, "Ultra-wide Tuning Frequency Range Active Frequency Selective Surface Based on Enhanced Magnetic Coupling," PIERS, Guangzhou, August 2014.
- [662] K. Xu, R. J. Spiegel, Y. Zhang, W. T. Joines, and Q. H. Liu, "Patch Antenna with Electrically Tunable Ferrite-ferroelectric Bilayer," PIERS, Guangzhou, August 2014.
- [663] K. Xu, R. Y. Zhang, R. J. Spiegel, W. T. Joines, and Q. H. Liu, "Memristor-based UWB Antenna with Reconfigurable Notched Band," PIERS, Guangzhou, August 2014.
- [664] L. Liu, J. Zhang, X. Zhao, and Q. H. Liu, "Study of Electrical Effects of Charged Nanoparticles on a Small Vesicle Using Coarse-grained Molecular Dynamics Simulations," PIERS, Guangzhou, August 2014.