Logistics of the Class

- Instructors: Jungsang Kim and Geert Vrijsen
  - Office: FCIEMAS 2519 / Chesterfield 4830
  - jungsang@duke.edu, gv23@duke.edu
- Class Hours: Mondays and Wednesdays 10:05-11:20am, Hudson 218
  - Lectures on Mondays on the basic physics/principles
  - Programming exercises on Wednesdays to calculate the atomic behavior
- Office Hours: To be Determined
- Key Reference: Cohen-Tannoudji, Diu and Laloe, "Quantum Mechanics Volume II", Wiley-VCH & Sons
- Lecture Notes will be available on the course website
  URL http://people.ee.duke.edu/~jungsang/ECE590_01/

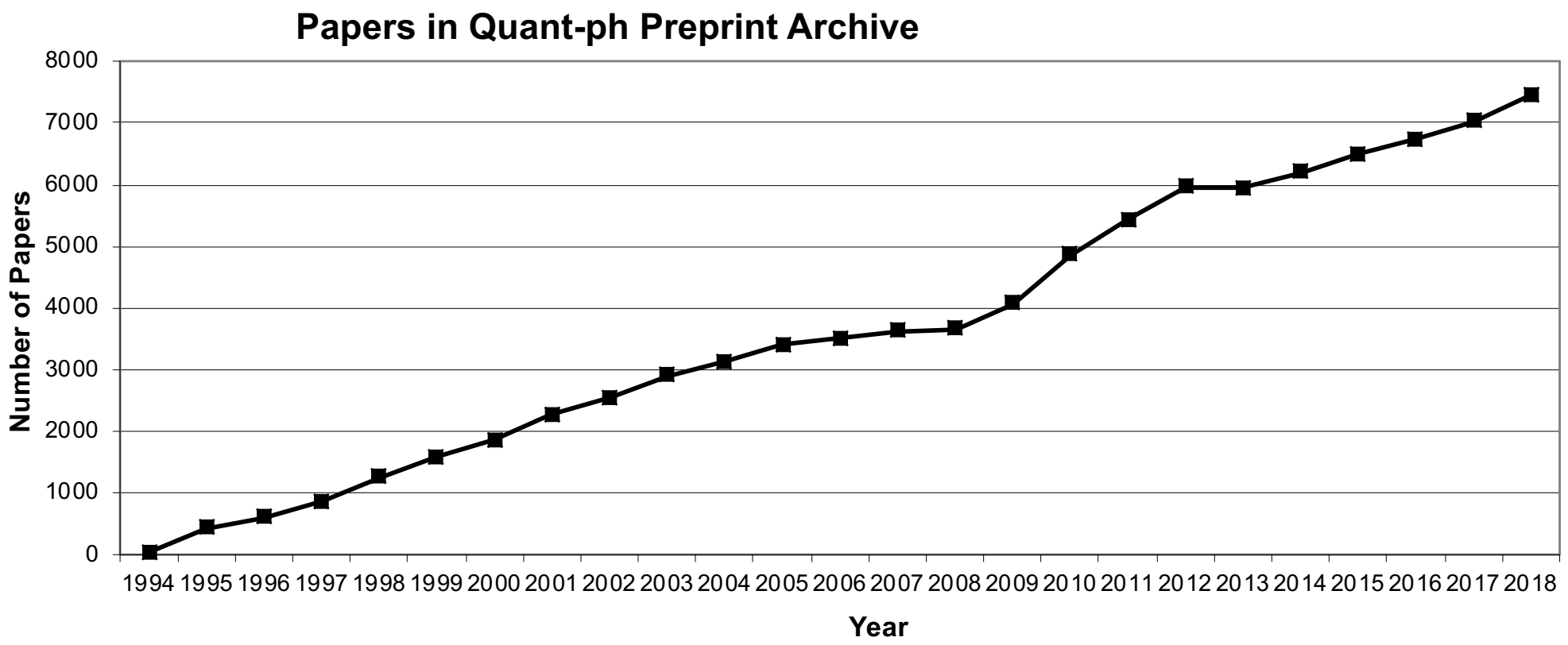
Workload and Grades

- Workload for the course
  - Class Participation (Active discussions and paper reviews in class)
  - Programming Assignments (50% of the class time will be dedicated to programming)
  - Mid-term Exam: format TBD, likely a take-home exam
  - Final Exam/Project: format and content TBD
- Grades
  - Programming Assignments 50%
  - Mid-term Exams 20%
  - Final Exam/Project 30%

Research Field

- Quantum Information Science is a vast field of Research!!

  Too much new information coming out every year to cover it in its entirety!!



Tentative Topics to be Covered…

1. Review on Angular Momentum in Quantum Mechanics
2. Energy levels in the Hydrogen Atom
3. Spin-Orbit Coupling and Fine Structure
4. Magnetic Moment
5. Hyperfine Structure
6. Perturbation Theory
7. Dipole Transition and Selection Rules
8. Density Matrix Formulation
9. Atomic Coherence
10. Trapping and Laser Cooling
11. Rydberg Atoms
12. Atom Interferometry
13. Quantum Computing and Networking