In this spring 2013 semester, PHY-565 will be devoted to the burgeoning area of Atomic Physics. It will focus on modern topics suitable for the laser era and emphasize the ideas that capture the attention of the research groups in our department (it can also be a breadth course). It will not be mired in the details of atomic structure and other arcane topics.

The course will begin by addressing several very current topics in the simple language of two level atoms. These include, but are not limited to atom optics and interferometry, the Ramsey method, the Bell inequalities, entanglement and quantum information, the non-cloning theorem, etc. After that we can turn to the role of the multilevel structure of real atoms which will take us to laser cooling, optical pumping, non-linear optics, Bose-Einstein condensation, and other subjects. Once all these topics are in hand there will be an introduction to spontaneous emission based upon the ubiquitous density matrix description. Only in the latter part of the course will we discuss fine and hyperfine structure, external fields, multi-electron atoms, etc. The tentative syllabus will soon be accessible from the department website.

Atomic, Molecular, and Optical (AMO) physics is one of the largest and fastest growing research areas, and our department has recognized the importance and emergence of this field by adding two (yup, two) new faculty members starting this January. Tom Allison is already here and Eden Figueroa arrives in another week. The growth and importance of AMO has also been recognized by the Royal Swedish Academy: there have been four Nobel prizes in the field during the past 15 years, most recently in 2012.

AMO in our department is strong and growing. There are three established experimental groups headed by Dominik Schneble, Tom Weinacht, and Hal Metcalf, and the two new ones mentioned above. You may have heard some of us in the Friday afternoon seminars, and there will be more. All five groups offer fascinating research topics and financial support for interested students. In addition to the experimental groups, we offer opportunities in the Laser Teaching Center with Dr's. John Noé and Marty Cohen, support of our own theorist Tom Bergeman, quantum information studies with Tzu-Chieh Wei of the YITP, and weekly seminars by outside visitors. For now, you may want to pay more-than-casual attention to this blatant advertisement.