

# 228 OPTICS AND MODERN PHYSICS

This course, 228, will take you on a voyage of discovery through 20<sup>th</sup> century physics. At the dawn of the 20<sup>th</sup> c., no scientist, even in their wildest dreams could have imagined the revolution ahead. The discovery of atoms and particles, the notion of space time, the equivalence of matter and energy, the wave nature of particles & the particle nature of light waves, semiconductors, superconductors, the expanding universe... All these are part of a scientific revolution that continues today, and whose consequences

are rapidly transforming our world and impacting your life.

We will discuss & learn some of the key concepts behind this revolution. A big part of our work will be the study of waves. Light, and, amazingly matter also, is made up of waves. Each atom in your body is an electron wave. This is where we will begin - with the study of waves - with the study of light - the physics of light: optics. From light, we will go onto to study relativity, the quantum wave nature of matter, and then down down to the electronic, nuclear & ultimately the quark structure of matter, ending with a discussion of

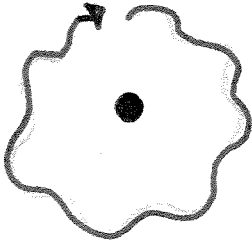
cosmology.

As in last semester's course, I hope, from the bottom of my heart, that you will take this opportunity to think & learn about concepts.

This course is not about plugging into equations: and we will do our best to emphasize this repeatedly from the lectures, to the recitations & the exams!



photon, electron



Bohr  
atom.



H<sub>2</sub>



Laser.

(Myriads of photons in perfect  
lock-step.)