L01-Introduction

Wednesday, August 26, 2015 9:22 AM

* Syllabus
  - recommend texts
  - class philosophy - faculty fellow - discussions
    - develop map of QM together (not like E&M)
    - provocative questions / guide discussion / fill gaps
    - I want relevance
  - go over assignments

* Introduction
  - what is physics? study of matter & interactions
    pillars: CM → EM → QM
    CM → SM → QM
  - what is classical physics & why?
  - Quotes: A. Michelson - misattributed
    Lord Kelvin - hint!
    (wave theory of light & particle theory of matter)

  - extensions of modern physics { 1st, 2nd quant. ħ
    - how do we benefit? { SR, GR, ... c
  - Concepts - students list "essence of QM"

  - Postulates - Sudbery

  - We just learned E&M: Classical Field theory
    now quantum field theory? NO!
    still classical fields → quantum particles
    - You learned a lot of QM in EM - Schrödinger too!
    - mathematics - almost identical!
      will fold it into the physics, not separate
    - new notation: $\hat{x}|x\rangle = x|x\rangle$ $\langle x'|\hat{x}|x\rangle = x\,\delta(x'-x)$

- new tool: Mathematica

- what will we do?
  solve BVP's, eigenfunction expansions

- general outline