Recitation #3
Quantum 522

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1. (Shankar 13.4.1) Show that if we ignore inter-electron interactions, the energy levels of a multi-electron atom go as Z^2. Since the Coulomb potential is Ze/r, why is the energy $\propto Z^2$?

2. (Shankar 13.4.2) Compare (roughly) the sizes of the uranium (Z=92) atom and the hydrogen atom. Assume levels fill in the order of increasing n, and that the non-relativistic description holds. Ignore inter-electron effects. Actually, electrons per shell for uranium are 2, 8, 18, 32, 21, 9, 2.

3. Shankar 13.4.3 Visible light has a wavelength of approximately 5000A. Which of the series? Lyman, Balmer, Paschen?do you think was discovered first?