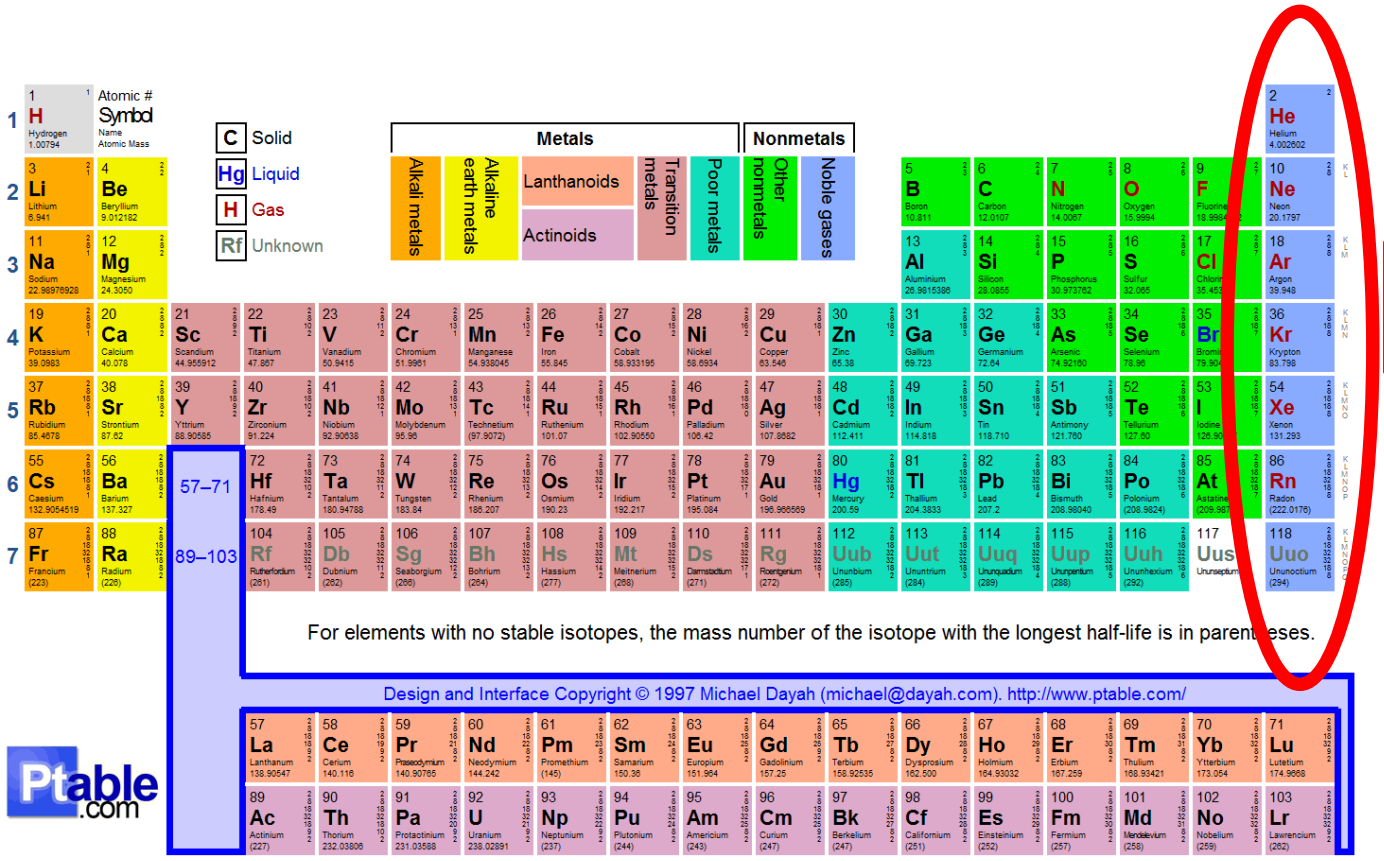
Nuclear Shell Model & Spin-Orbit Coupling

Motivation: Atomic Shell Model

… the periodic table

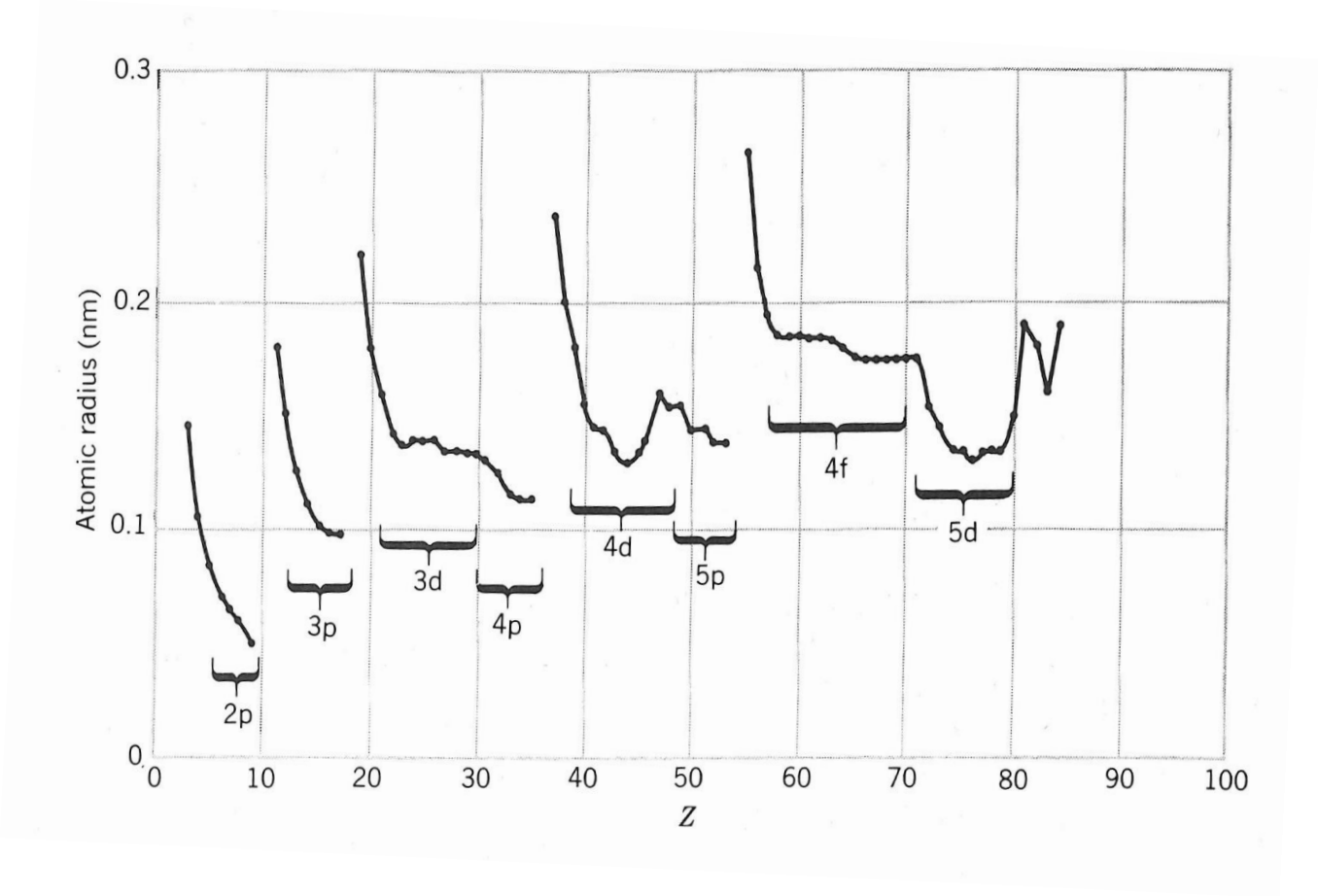


most chemically stable elements have filled shells

"magic" numbers:
2 , 10, 18, 36, 54, 86

Nuclear Shell Model & Spin-Orbit Coupling

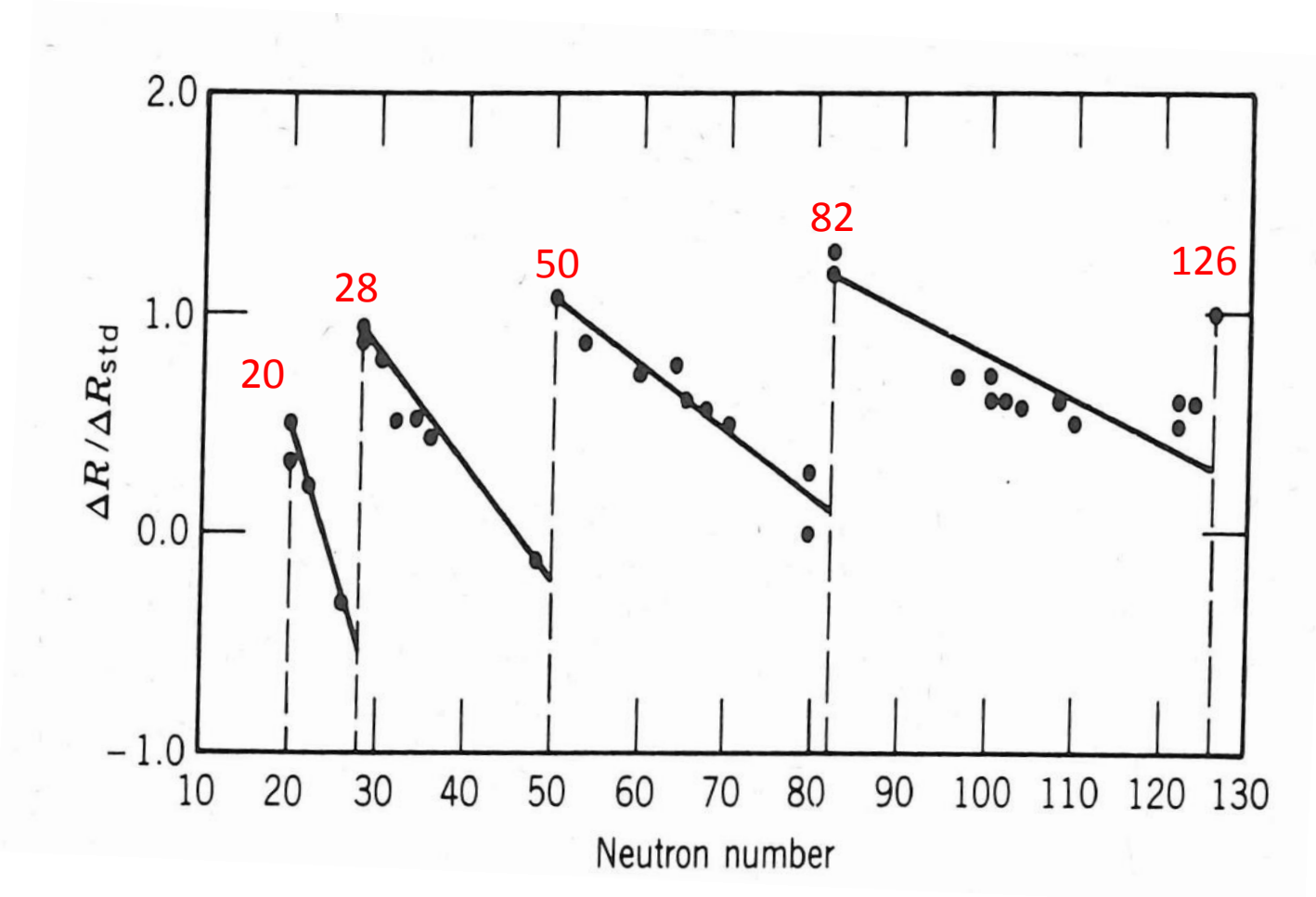
Atomic radius vs. electron number



[figure from *Introductory Nuclear Physics* by K. S. Krane]

Nuclear Shell Model & Spin-Orbit Coupling

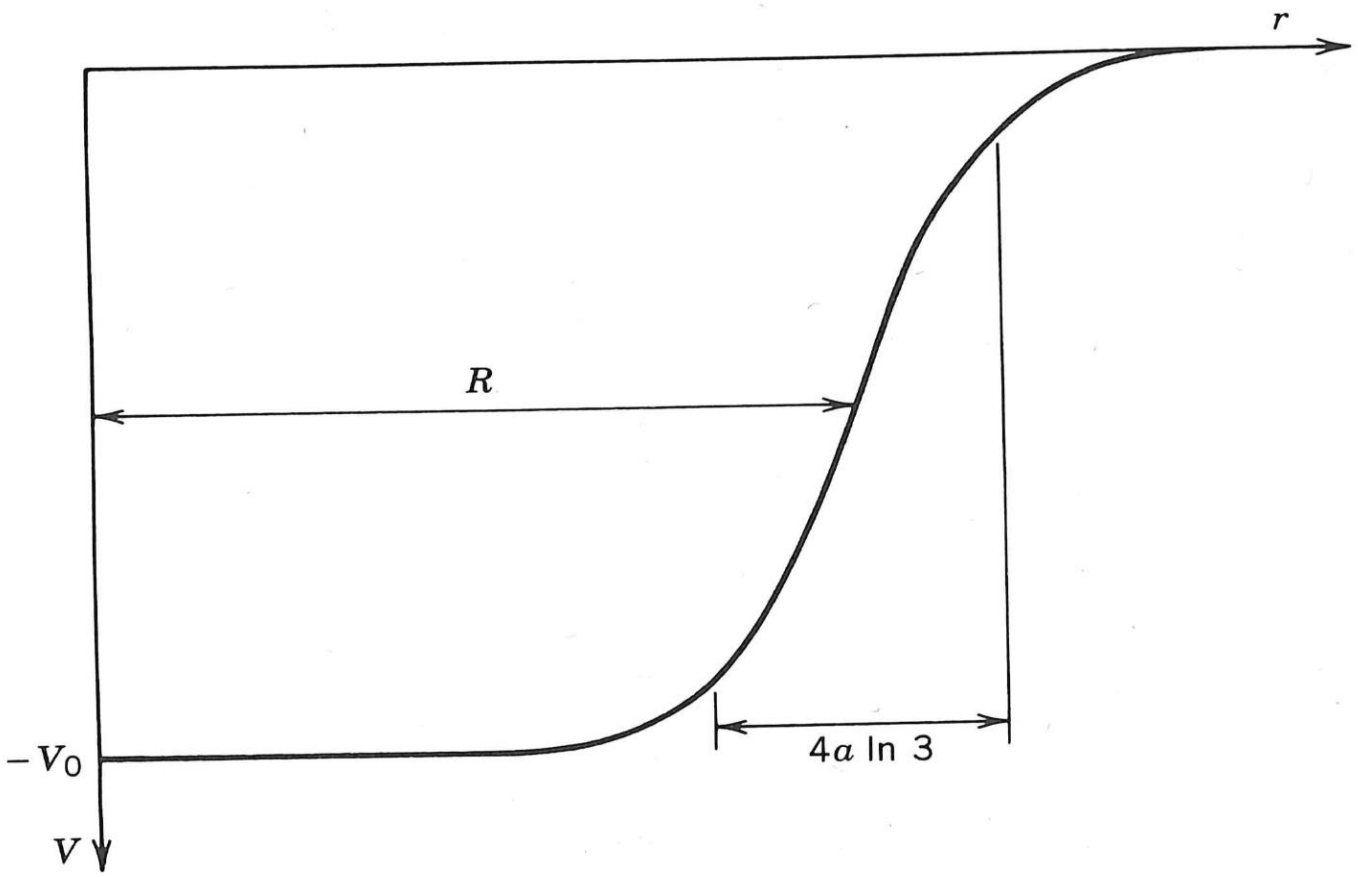
nuclear radius change vs. neutron number



[figure adapted from *Introductory Nuclear Physics* by K. S. Krane]

Nuclear Shell Model & Spin-Orbit Coupling

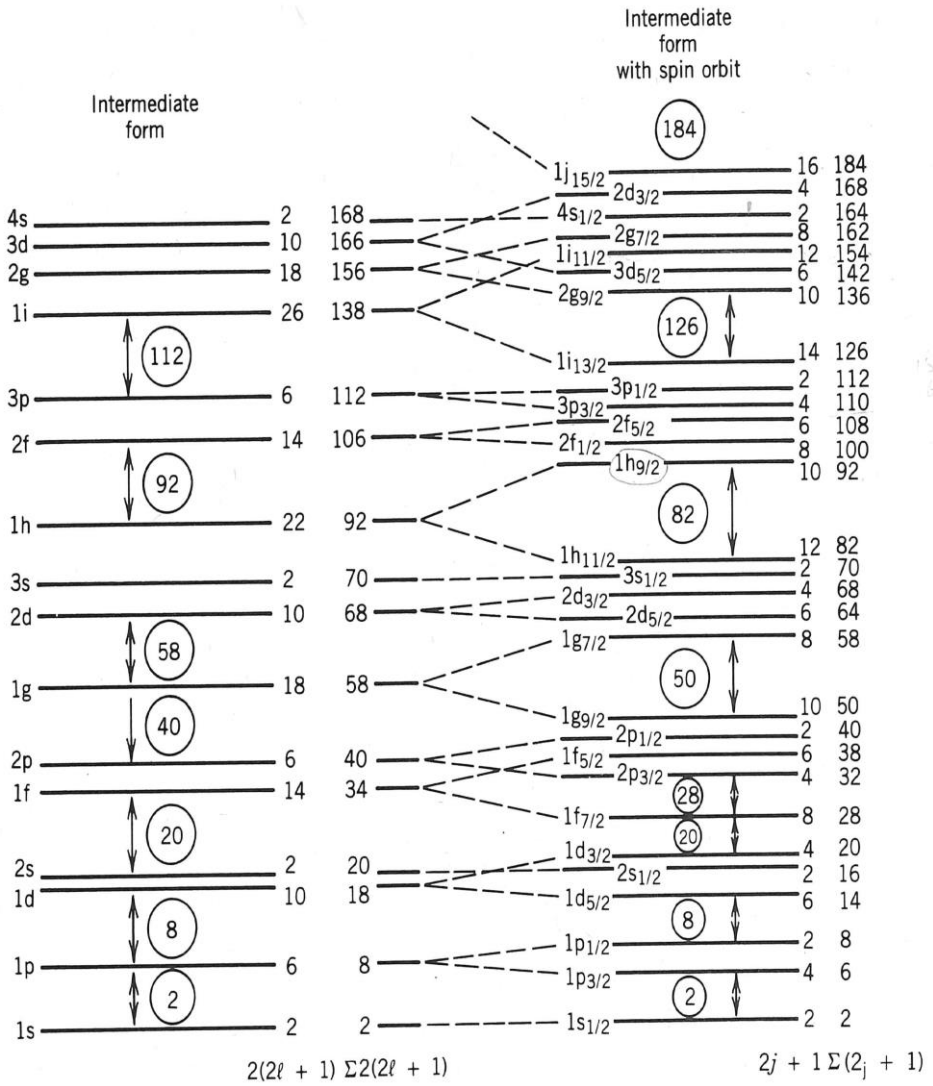
Nuclear shell model potential:
self-consistent potential = nuclear density



[figure from *Introductory Nuclear Physics* by K. S. Krane]

Nuclear Shell Model & Spin-Orbit Coupling

Nuclear shell model filling: magic numbers



[figure from *Introductory Nuclear Physics* by K. S. Krane]