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From total neutron cross sections to nuclear charge radii - Part 1

Monday 27 January 2025 10:35 (45 minutes)

Historical overview. War and peace. The foundation of the International Atomic Energy Agency. Total neutron cross sections; **matter radii**; correlation with binding energy. Visit to Ioffe Institute: K_α Isotope Shift $\rightarrow \delta r^2_{charge}$; other methods. Fine structure in **charge radii** along isotopic series: shell effects, odd-even, deformation. Fine structure along isotonic, isobaric, isosymmetric series: **Table I**. Comparison of experiment to theory; neutron skins calculated. Difference between r_{el} and r_{mu}. Evaluation procedures investigated: **Table II**. Comparison of evaluation methods. **Table III**. With completion: **Table IV**. Application of constraints: **Table V**. Moments of the two-parameter Fermi charge distribution. Calculation of Fermi parameters from charge moments. **Table VI**. with $\delta\langle r^2\rangle$. Correlation of nuclear charge radii with other nuclear observables. The proton radius puzzle.

Problems. Dispersion correction in electron scattering. Consequences of the proton radius puzzle: a) normalized data; b) charge radius formulae. Recommendation of radius formulae.

Future: *Weak (\approx neutron) rms radii from parity violating electron scattering?*

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