Measuring Radioactive Decay Without Detecting the Light Decay Particle(s)

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Abstract ID 33

Needed for the r-process, but badly known

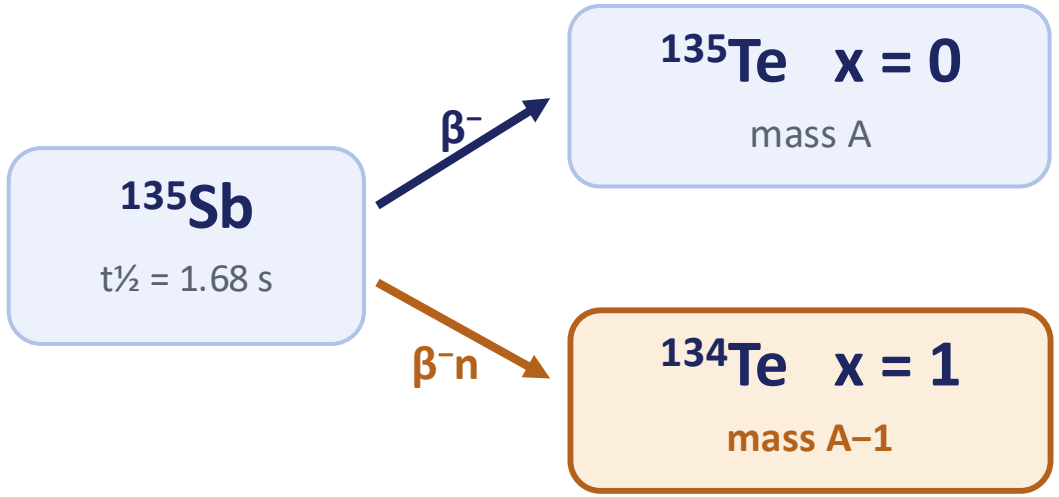
P_{1n} is measured for only ~49% of eligible fission products, P_{2n} for ~8%. For ^{135}Sb the five published values are mutually inconsistent — $\chi^2/\nu = 10.6$.

Our answer: never detect the neutron

β decay leaves the daughter at mass **A**; β-delayed neutron emission at **A−1**. Store the parents, let them decay, count the daughters by mass.

First βn test done — June 2025

FRS Ion Catcher, FAIR Phase-0: storage commissioned, background validated, analysis under way.



The neutron is never seen — it signs its presence by the missing mass unit.

$$P_{xn} = D_x(t_s) / \Sigma_i D_i(t_s)$$

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