

Mass-Energy & Binding

Physics

Why fusion and fission both release energy.

The mass of a nucleus is less than the sum of its nucleons; the difference is the binding energy.

$$E = \Delta mc^2 \cdot 1 \text{ u} = 931.5 \text{ MeV}$$

Light nuclei fusing

Moving up the curve.

Energy released

Heavy nuclei splitting

Also moving up.

Energy released

Iron-56

The peak.

Neither releases energy

THE COMMON MISTAKE

✗ **Reading total binding energy off the curve**

✓ **The curve is binding energy per nucleon**

Uranium has more total binding energy than iron but less per nucleon, and it is the per-nucleon figure that governs stability.

Stellar fusion stops at iron. A star that reaches an iron core has no energy source left, and collapses.