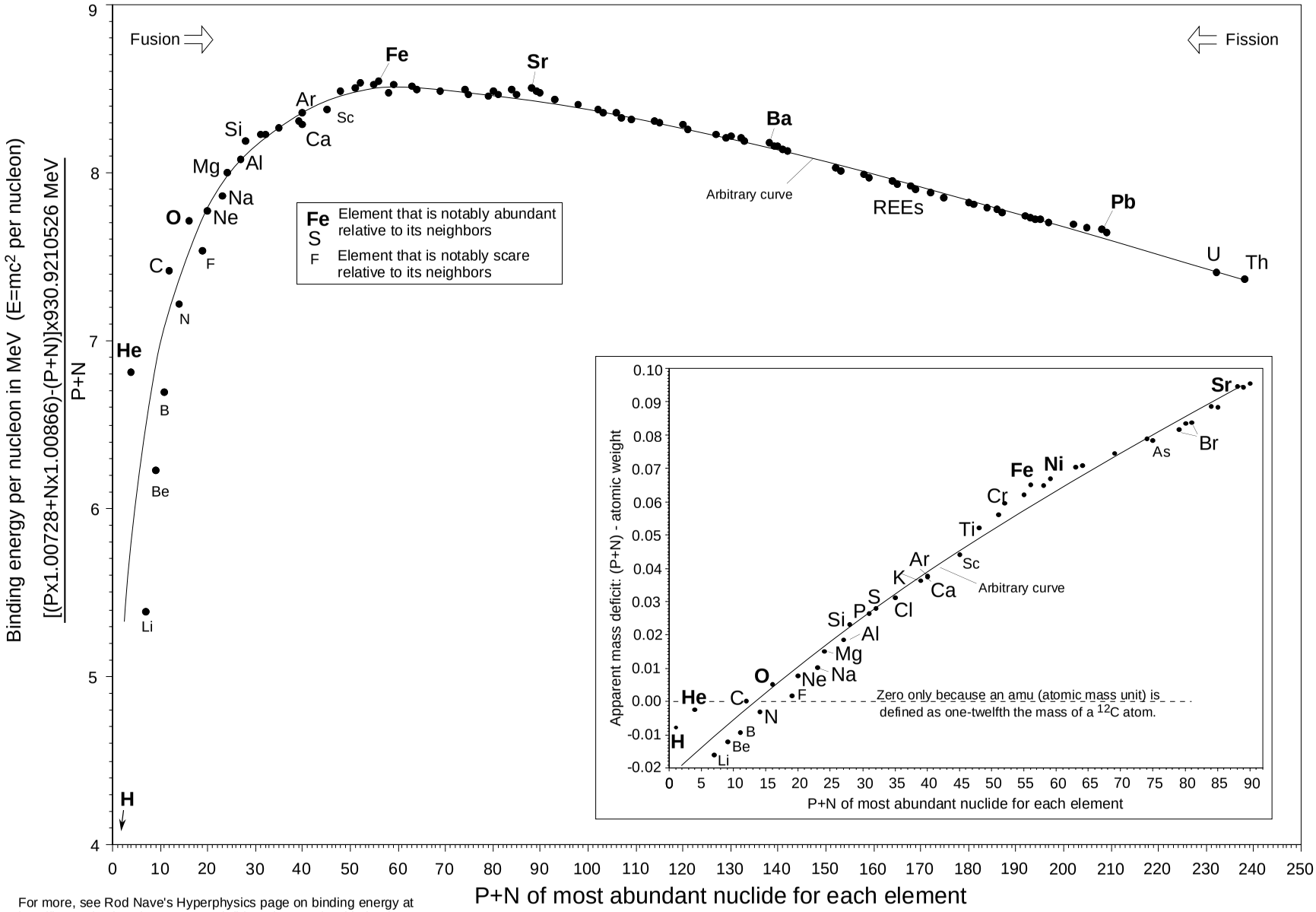
Binding energy and elemental abundance

The atomic masses of the various nuclides are less than one would expect from numbers of protons and neutrons in those nuclides (e.g., the mass of ^{40}Ca is 39.963 amu) (see vertical axis of inset). That apparent deficit of mass is the mass consumed as the energy that binds the nucleus together.

Binding energy (the vertical axis of the main plot) is calculated from the apparent mass deficit using Einstein's $E=mc^2$ relationship. The significance to cosmochemistry and geochemistry is that the most abundant elements relative to their neighbors are those with relatively large binding energies. The big winner in this derby is iron.



For more, see Rod Nave's Hyperphysics page on binding energy at http://hyperphysics.phy-astr.gsu.edu/hbase/nucene/nucbin.html .