Massachusetts Institute of Technology

Department of Physics

Course: 8.701 – Introduction to Nuclear and Particle Physics
Term: Fall 2020
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Discussion Problems
from recitation on **November 12th, 2020**

Problem 1:   Binding energy of iron

The iron nuclide $^{56}_{26}$Fe lies near the top of the binding energy curve and is one of the most stable nuclides. What is the binding energy per nuclean (in MeV) for the nuclide $^{56}_{26}$Fe (atmic mass of 55.9349 amu)?

Problem 2:   Carbon dating

You find a pottery shard containing 1g of carbon. Its activity is 0.0231 Bq (decays per second). How old is it? Same background: ^{14}C is radioactive and produced in the upper atmosphere and we find in living things a ratio of $\frac{^{14}C}{^{12}C}$ of 1.2×10^{-12}. The half-life of ^{14}C is 5730 years.

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