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|  | PHYS 301 Hwk-1 on Nuclear Physics Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. In a Rutherford scattering experiment, assume that an incident alpha particle (radius 1.80 fm) is headed directly toward a target gold nucleus (radius 6.23 fm). What energy must the alpha particle have to just barely “touch” the gold nucleus?  2. What is the nuclear mass density *ρm* of (a) the fairly low-mass nuclide 55Mn and (b) the fairly high-mass nuclide 209Bi? (c) Compare the two answers, with an explanation. What is the nuclear charge density *ρq* of (d) 55Mn and (e) 209Bi? (f) Compare the two answers, with an explanation. |
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3. What is the binding energy per nucleon of the americium isotope http://edugen.wiley.com/edugen/courses/crs4957/halliday9118/halliday9088c42/math/math038.gif? Here are some atomic masses and the neutron mass.

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| http://edugen.wiley.com/edugen/courses/crs4957/common/art/pixel.gif | |
| http://edugen.wiley.com/edugen/courses/crs4957/halliday9118/halliday9088c42/math/math039.gif |  |
| http://edugen.wiley.com/edugen/courses/crs4957/common/art/pixel.gif | |