

5. (25 pts) Current atomic theory states that atoms are made of protons, neutrons, and electrons.

a) Which of these particles are fundamental particles? (i.e. They cannot be broken into smaller particles, so far as we have been able to tell.)

Of the particles that make up atoms, only the electron is a fundamental particle. Protons and neutrons can be further broken into “smaller” particles.

b) The remaining particle(s) *are* composed of smaller, more fundamental particles. What are these smaller particles called?

Protons and neutrons are composed of *quarks*.

c) In a certain nuclear reaction, energy is released. How does the mass of the reaction products compare to the mass of the reaction ingredients?

Since energy is released, the mass of the products is *less than* the mass of the ingredients.

d) Fill in the missing numbers in the following nuclear reaction:

