Answer on Question #51637-Physics-Atomic Physics

How is energy convertible in matter? Please site examples.

Answer

We routinely make mass from kinetic (moving) energy generated when particles collide at the near-light speeds attained in particle accelerators. Some of the energy changes into mass in the form of subatomic particles, such as electrons and positrons, muons and anti-muons or protons and anti-protons. The particles always occur in matter and anti-matter pairs.

Even more exotic: black holes convert energy into matter. Near the surface of a black hole, matter-antimatter particle pairs apparently pop into existence; then one particle falls into the hole, while the other escapes.

Using magnetic fields, though, we have managed to trap a small amount of anti-matter. Indeed, in 1995, scientists at the CERN accelerator in Switzerland made nine anti-hydrogen atoms.

Einstein showed us, with his deceptively simple equation (energy = mass times the speed of light, squared), that mass is simply another form of energy. We can, and do, go both ways: mass to energy and energy to mass.