

When its true implications are taken into account, Einstein's equation of energy and matter represent the possibility of a multi-dimensional interpretation of the total universe in which the so called "MATERIAL UNIVERSE" is realized to be a paradoxical *entity* (God) and *process* (creation).

-Franklin Jones

Scientists Create Matter Out of Light

German-born American physicist Albert Einstein's elegant equation $E = mc^2$ predicted that energy could be converted to matter. Using a linear accelerator and high-energy laser light, physicists have done just that.

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Physicists at the Stanford Linear Accelerator Center (SLAC) in California have succeeded in producing particles of matter from very energetic collisions of light. The team, which included researchers from Stanford University, the University of Rochester in New York, the University of Tennessee in Knoxville, and Princeton University in New Jersey, published an account of their work in the September 1, 1997, issue of the journal *Physical Review Letters*.

Scientists have long known that matter can be converted to energy and, conversely, energy can be converted to matter. In 1905 physicist Albert Einstein quantified the relationship between matter and energy in his famous equation $E = mc^2$, in which E is energy, m is mass, and c is the speed of light (300,000 km/sec [186,000 mi/sec]). In an atomic bomb blast, a very small amount of matter is converted to its equivalent in energy, creating an immense explosion.

Scientists have also created matter from energy by bombarding *heavy atoms* (atoms made up of many protons and neutrons) with high-energy radiation in the form of X rays. Collisions between the X-ray beam and the atoms created matter in the form of sets of electron and *positron* particles, a phenomenon known as pair production. Positrons are particles that have the same weight and amount of charge as electrons, but positrons are positively charged, while electrons are negatively charged.

In the recent experiments at SLAC, physicists accelerated a beam of electrons to nearly the speed of light. They then aimed a split-second pulse of high-energy laser light directly at the electron beam. Occasionally a *photon* (a tiny, discrete unit of light energy) collided with an electron. The photon then recoiled from the collision and rebounded into oncoming photons from the laser beam with such violence that the resulting energy was converted into an electron-positron pair. Over several months of such experiments, the physicists were able to produce more than 100 electron-positron pairs.