

.: Boom! From Light Comes Matter

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PALO ALTO, Calif. -- In Physics 101, our instructors drilled us on the Law of Matter Conservation: "Thou shalt not create matter from nothing." However, a team of 20 physicists/lawbreakers has done just that, by converting light into matter.

The team, composed of scientists from Stanford University, the University of Rochester in Rochester, N.Y., Princeton University in Princeton, N.J., and the University of Tennessee at Knoxville, bumped a 46.6-GeV electron beam from the 2-mile-long Stanford Linear Accelerator into a photon beam at 527 nm from a "tabletop terawatt" Nd:glass laser developed at Rochester's Laboratory for Laser Energetics. The result was what researchers call the first electron-positron pairs created via a "light by light" process.

During the two-step process, a high-energy electron travels through laser-focusing optics, then "kicks" one of the photons at nearly 30 GeV of energy. That photon reacts with the other photons to produce particles of matter.

According to team representative Adrian Melissinos, professor of physics at Rochester, the significance of the experiment was the production of matter using real photons, as opposed to "virtual photons" that appear for a fleeting moment and disappear in the vacuum.

Melissinos acknowledges that practical applications are very limited. Apparently, for this team of rogue physicists, just knowing that they have broken a fundamental law in physics is enough.

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