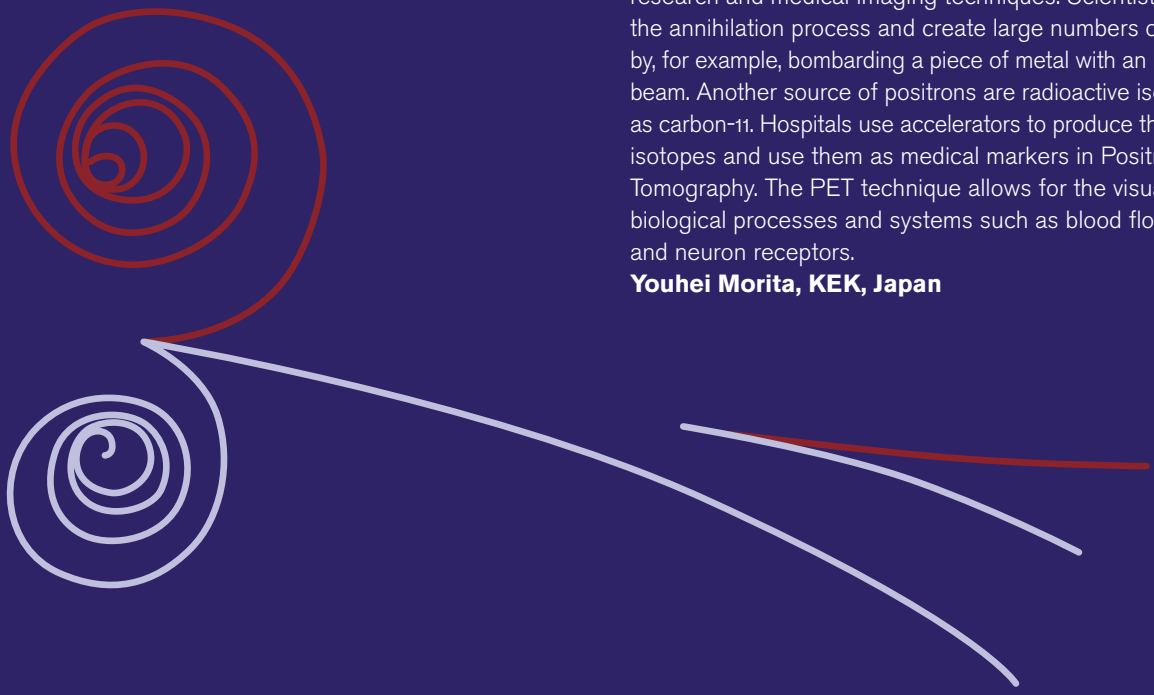
explain it in 60 seconds

A positron is the antimatter partner of an electron. It has exactly the same mass as an electron but has the opposite electric charge. When kept separate from matter, positrons can exist forever. However, when a positron meets an electron, the two particles annihilate into a flash of energy.

Theorist Paul Dirac predicted positrons and other antiparticles in 1928. Combining the classical description of an electron's motion with the new theories of relativity and quantum mechanics, Dirac found a puzzling solution to his equations: an electron moving with negative energy, which is impossible in classical physics. He interpreted his result as an antiparticle moving with positive energy. Four years later, physicist Carl Anderson observed in a cloud chamber experiment the positron predicted by Dirac. For their discoveries, both Dirac and Anderson received Nobel Prizes.

Today, positrons have numerous applications in particle physics research and medical imaging techniques. Scientists can "reverse" the annihilation process and create large numbers of positrons by, for example, bombarding a piece of metal with an intense electron beam. Another source of positrons are radioactive isotopes such as carbon-11. Hospitals use accelerators to produce these short-lived isotopes and use them as medical markers in Positron Emission Tomography. The PET technique allows for the visualization of biological processes and systems such as blood flow, metabolism, and neuron receptors.

Youhei Morita, KEK, Japan



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