2. Pair Annihilation:

The phenomenon in which a particle and its antiparticle combine together such that they undergo complete destruction resulting energetic radiation (γ radiations) is known as Pair Annihilation.

i.e., $electron + positron \rightarrow 2\,photons$

or, $e^- + e^+ \rightarrow \gamma + \gamma$

In the Pair Annihilation, the electron and positron combine with each other and annihilate. Surely, the particles are disappeared and radiation energy will occur instead of two particles.

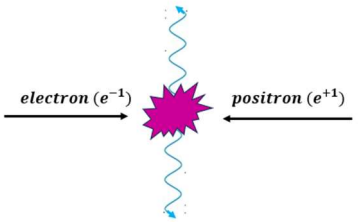

Figure: Pair Annihilation

*This process provides evidence for Einstein's mass- energy relation that **mass can be converted into energy.***

Four Forces [Interactions] In Nature:

1. Gravitational force (Universal force):
   a) Interaction between two masses.
   b) It is attractive in nature & has infinite range.
   c) It is weakest force to be known.
2. Weak force:
   a) Interaction between Leptons & Hadrons.
   b) It is stronger than gravitational force.
   c) It has a short range.
   d) This interaction leads to Beta decay of Muon, Neutron, K-meson etc.
3. Electromagnetic force:
   a) Interaction between charged particles & the particle having electric and magnetic moments is called as electromagnetic interaction & leads to electromagnetic force.
   b) It is stronger than weak force & gravitational force.
   c) It has infinite range.
4. Strong force or nuclear force:
   a) Interaction occurs only among Baryons, antibaryons and meson are called strong force.
   b) These are nuclear forces.
   c) This is a short-range interaction force.

Fundamental Force Particles

Force	Particles Experiencing	Force Carrier Particle	Range	Relative Strength*
Gravity acts between objects with mass	all particles with mass	graviton	infinity	much weaker ↓ much stronger
Weak Force governs particle decay	quarks and leptons	W^+, W^-, Z^0 (W and Z)	short range	
Electromagnetism acts between electrically charged particles	electrically charged	γ (photon)	infinity	
Strong Force binds quarks together	quarks and gluons	g (gluon)	short range	