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Water and Anti-Matter can Create a Light (Photon) and Separate the Fundamental Forces into Gravity and Others by the Symmetry Breakage

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Abstract

Water (H_2O) is made of hydrogen and oxygen atoms. Antimatter is made of antiparticles, antihydrogen (antiprotons + positrons) and antioxygen (anti-oxygen nuclei + positrons). If we bring antimatter into contact with matter (like water), they annihilate each other.

Electron + Positron \rightarrow Photons (light).

When an electron from water meets a positron from antimatter, they annihilate into two gamma-ray photons.

Proton + Antiproton \rightarrow Photons + Other Particles

This produces not just gamma rays, but also pions, which may decay into more photons, electrons, muons, etc.

Neutron + Antineutron \rightarrow High-energy particles and photons

This is even more complex but still releases a lot of energy, often as light and other radiation.

The outcomes are a release of energy, including high-energy gamma rays (light) and heat and possibly visible light from the resulting energetic reactions with surrounding material. This reaction is energetic. Just 1 gram of anti-matter annihilating with 1 gram of matter releases about 90 Terajoules of energy, similar to a small nuclear bomb [1].

In the presence of certain heavy nuclei, if the heavy nucleus is radioactive and decays via beta-plus decay (emitting a positron). There's a high-energy photon field (e.g. in a reactor or near a particle accelerator), causing pair production (a gamma photon converting into an electron-positron pair near a nucleus). If it's in an environment with very heavy atoms and high-energy conditions, positrons could be generated, which then might annihilate with electrons in the water. Once a positron is around, it will tend to slow down and find an electron to annihilate with (most often in surrounding matter like water). The annihilation isn't affected much by the nucleus itself, except maybe for slight effects on positronium formation (a temporary electron-positron bound state). In nuclear reactors, high-energy gamma photons can interact with heavy nuclei to produce electron-positron pairs (pair production), which can then annihilate (the Spirit of God was hovering over the waters).

In the earliest moments after the Big Bang (as early as $\sim 10^{-43}$ seconds, the Planck time), it's believed that all four fundamental forces were unified into a single, indistinguishable force. As the universe expanded and cooled, these forces "separated" (i.e., spontaneously broke symmetry) at different energy scales. At the Planck Scale ($\sim 10^{19}$ GeV), It's hypothesized that gravity separated from the other three forces. At the Grand Unification Scale ($\sim 10^{15}$ – 10^{16} GeV), the strong force separates from the electroweak force. This is the domain of Grand Unified Theories (GUTs) like SU(5), SO(10), etc. GUTs aim to unify the strong, weak, and electromagnetic forces into one. At the Electroweak Scale (~ 100 GeV), The electroweak force splits into the weak nuclear force and electromagnetism (photons) [2].

Time after Big Bang	What existed?	Water
10^{-43} seconds (Planck time)	create Heaven	No
10^{-35} sec to 10^{-6} sec	Quark-gluon plasma	No
~ 1 microsecond	Protons, neutrons form	No
~ 3 minutes	Nuclei form (H, He, some Li)	No water yet
$\sim 380,000$ years	Atoms (H_2O) form by the energy from Heaven	Yes (create earth)

Table 1: The Timeline of Genesis in the Aspect of Physics

References

1. Genesis 1: 2-3.
2. Genesis 1:4.