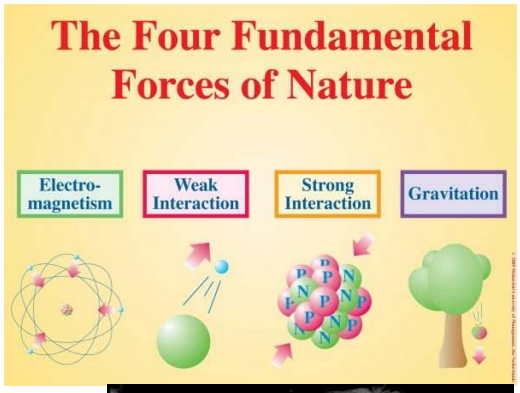
PHYSICISTS CONFIRM A POSSIBLE 5TH FORCE



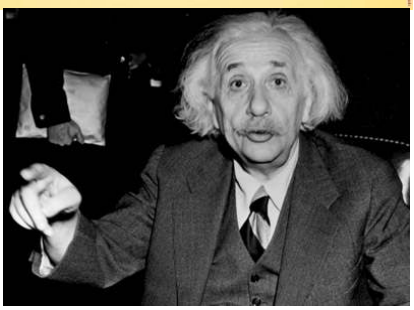
Theoretical physicists speak of four fundamental forces of nature:

1. Gravity
2. Electromagnetism
3. The Strong Nuclear Force that rules the inner workings of atoms, together with
4. The Weak Nuclear Force

These four forces control all the physical actions and interactions in Nature as we currently understand them. In recent months, the physics community has been buzzing with word of a possible 5th fundamental force.

On August 14, 2016, physicists at University of California, Irvine announced they have confirmed evidence for this new force on theoretical grounds, using experimental data acquired by Hungarian scientists in 2015. They did uncover a radioactive decay anomaly that points to the existence of a light particle just 30 times heavier than an electron.

If confirmed by further experiments, this discovery would completely change our understanding of the universe, with consequences for the unification of forces and dark matter.



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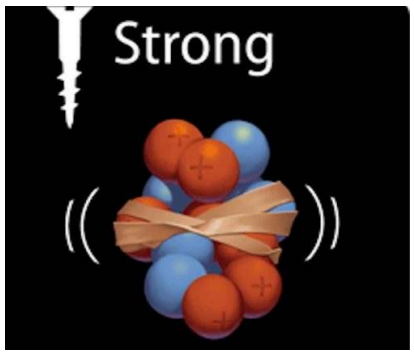
THE FORCES AS WE UNDERSTAND THEM

- G Albert Einstein explained the 1st fundamental force, Gravity, in 1915 in his General Theory of Relativity as a function of Space and Time.
- G The 2nd fundamental force, Electromagnetism, acts between electrically charged particles. It rules the world of atoms and molecules and thus plays a major role in determining the internal properties of most of the objects we encounter in everyday life.
- G The 3rd fundamental force, the Strong Force, acts between quarks and between nucleons or, in general, between hadrons. It thus holds the atomic nucleus together.
- G The 4th force, the weak force, is responsible for radioactive decays. It makes neutrons turn into protons, among other things. Every type of matter particle experiences it.

The 2nd force, Electromagnetism here made visible in this lightning strike on the World Trade Centre

After studying the Hungarian researchers data, as well as previous experiments in this area, the UCI group was able to show on theoretical grounds that the evidence strongly disfavors both matter particles and dark photons. They proposed a new theory that synthesizes the existing data and determined that the discovery could indicate a 5th fundamental force.

Like many scientific breakthroughs, this one opens entirely new fields of inquiry. One intriguing direction is the possibility that this potential 5th force might be joined to the electromagnetic and strong and weak nuclear forces as manifestations of one grander, more fundamental force.

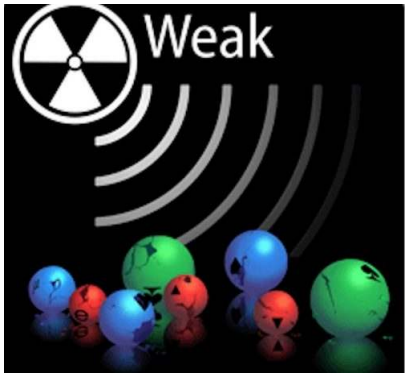


The Strong Force holds together atomic nuclei of the atoms of matter.

At this stage the experimentalists are not able to claim that it is a new force. They simply see an excess of events that indicate a new particle, but it is not yet clear to them whether it is a matter particle or a force-carrying particle.

The particle is not very heavy, and laboratories have had the energies required to make it since the '50s and '60s. But the reason it has been hard to find is that its interactions are very feeble. That said, because the new particle is so light, there are many experimental groups working in small labs around the world that could and can follow up the initial claims, now that they know where to look.

AK, with EarthSky and ScienceDaily Notes



The Weak Force, is responsible for radioactive decay in atomic matter