

A vibrant, multi-colored visualization of cosmic structures, likely a galaxy cluster or a large-scale filament. The image features intricate, swirling patterns of blue, green, yellow, and red, set against a dark background filled with numerous bright, multi-colored stars. The overall appearance is that of a complex, dynamic system.

COSMIC MANIPULATION

WEEK 7



What is the power of cosmic manipulation?

- User can create, shape and manipulate cosmic energies to produce nearly any effect they desire, including the molecular restructuring and transmutation of matter, the manipulation of matter and dark matter across space and time, the creation of force fields, the creation of inter-dimensional portals and vortices, telekinesis, and cosmic awareness
- The Silver Surfer once described it as being able to "hear the cosmic static of the universe's electromagnetic fields and detect the pain of dying stars or the rhapsody of planets aborning".





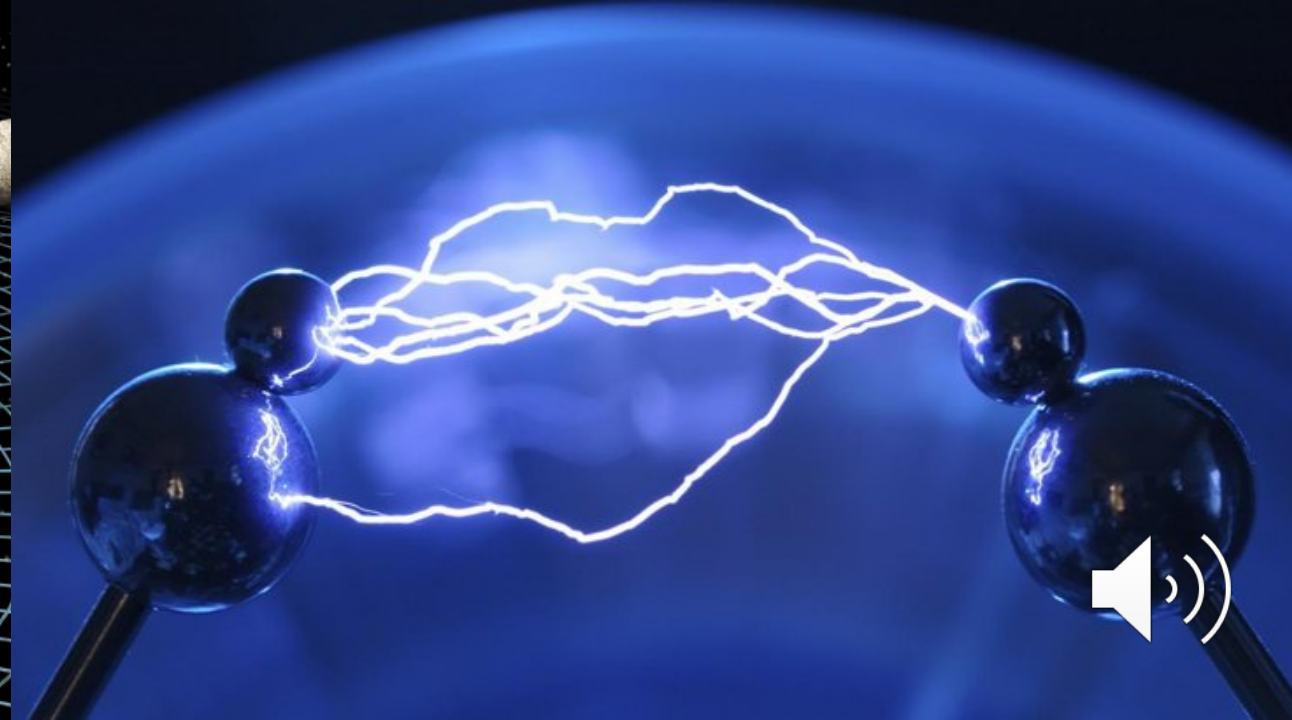
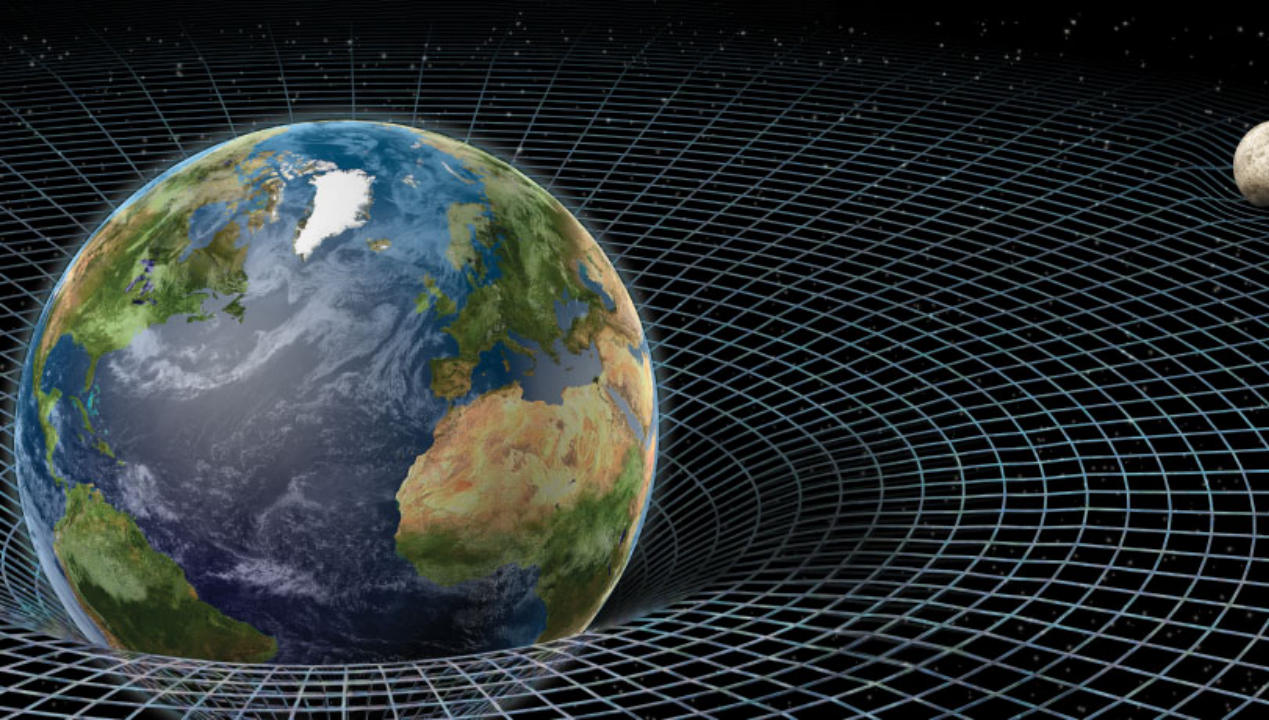
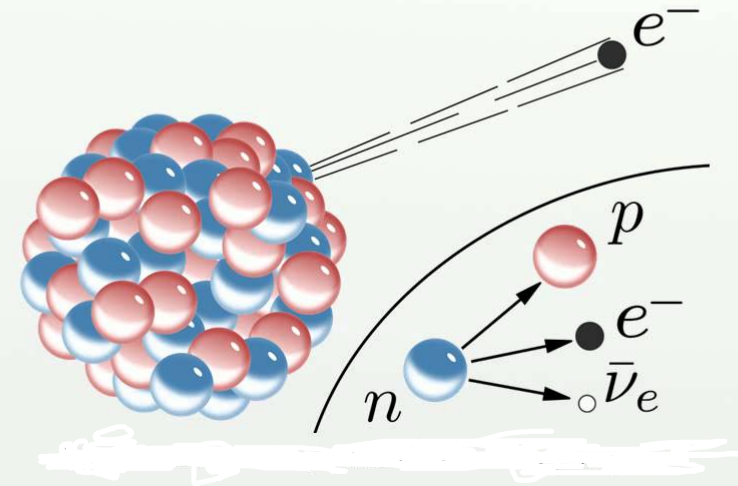
What aspects of this power will we focus on?

- The ability to control matter!
- To control baryonic matter you would need to be able to control the four fundamental forces of nature
- The ability to control dark matter is very interesting as dark matter is one of the most elusive and interesting mysteries in science.



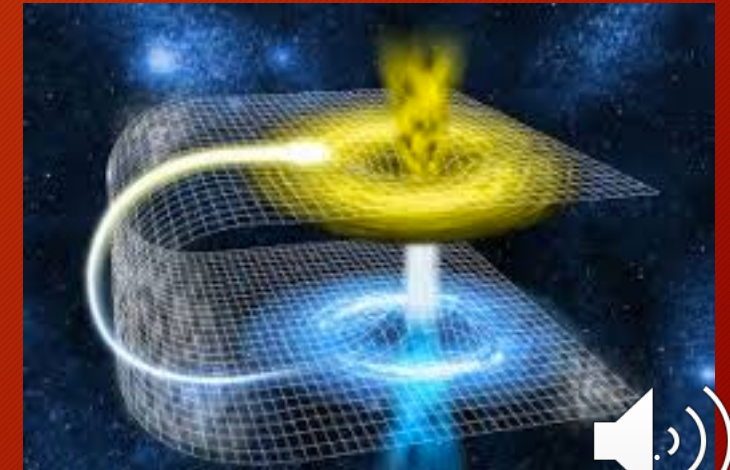
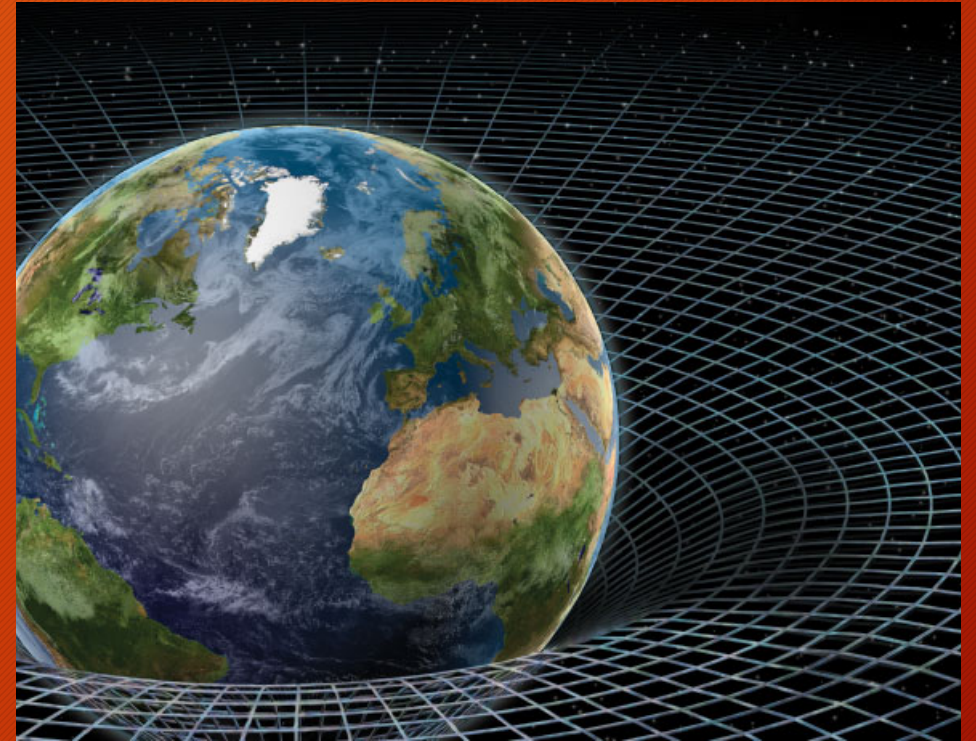


Weak interaction



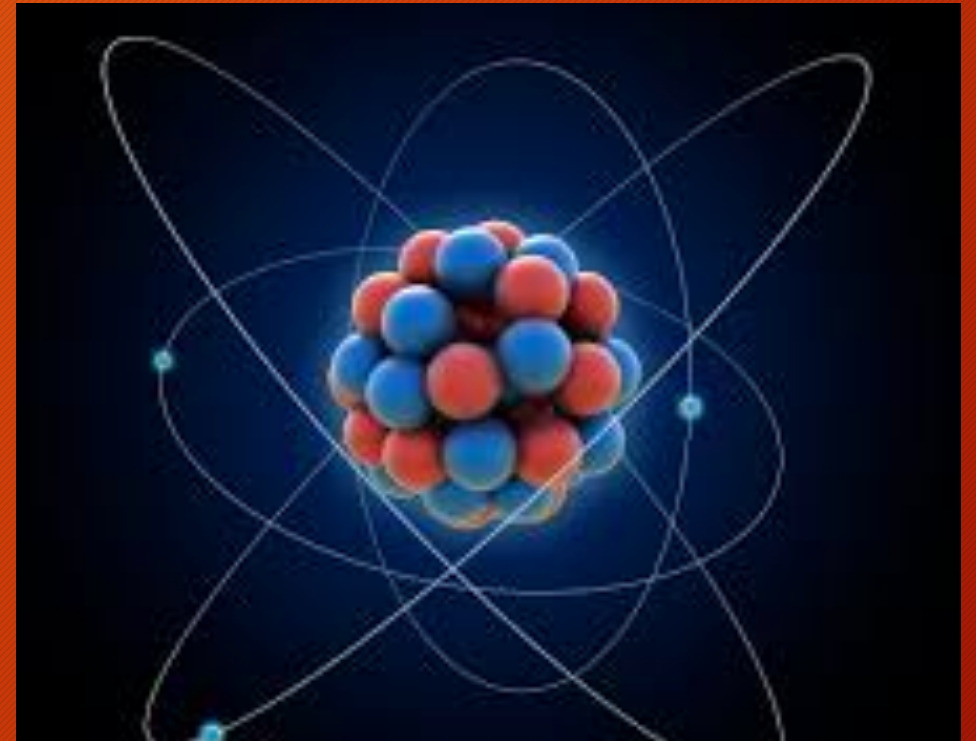
Gravitational Force

- The force that attracts a body towards the center of the earth, or towards any other physical body with mass.
- But gravity also can theoretically cause worm holes, allowing you to travel from one part of the universe to another.



Electromagnetic Force

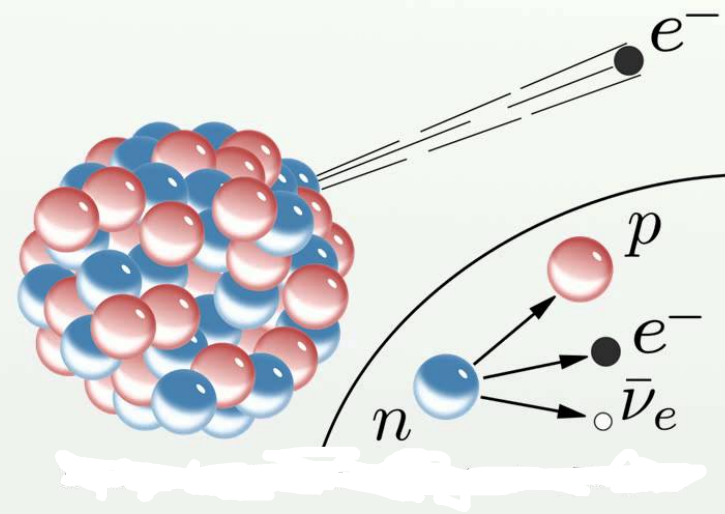
- the electromagnetic force acts between charged particles and is the combination of all electrical and magnetic forces. The electromagnetic force can be attractive or repulsive.
- It is the electromagnetic force that holds atoms together, superheroes who can transmute (change) matter from one form to another must be able to control the electromagnetic force.



Weak Force

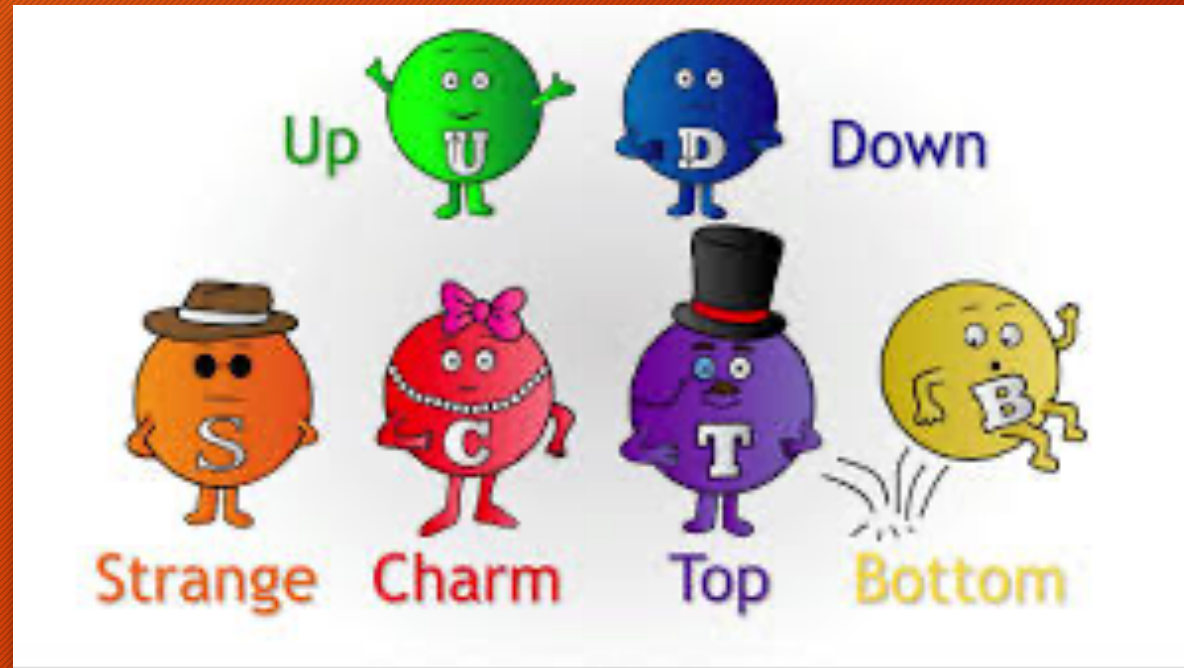
- In particle physics, the weak force is the mechanism of interaction between subatomic particles that causes radioactive decay and plays an essential role in nuclear fission
- Beta decay is just one example of the weak force. During beta decay a neutron disappears and is replaced by a proton, an electron and a neutrino

Weak interaction



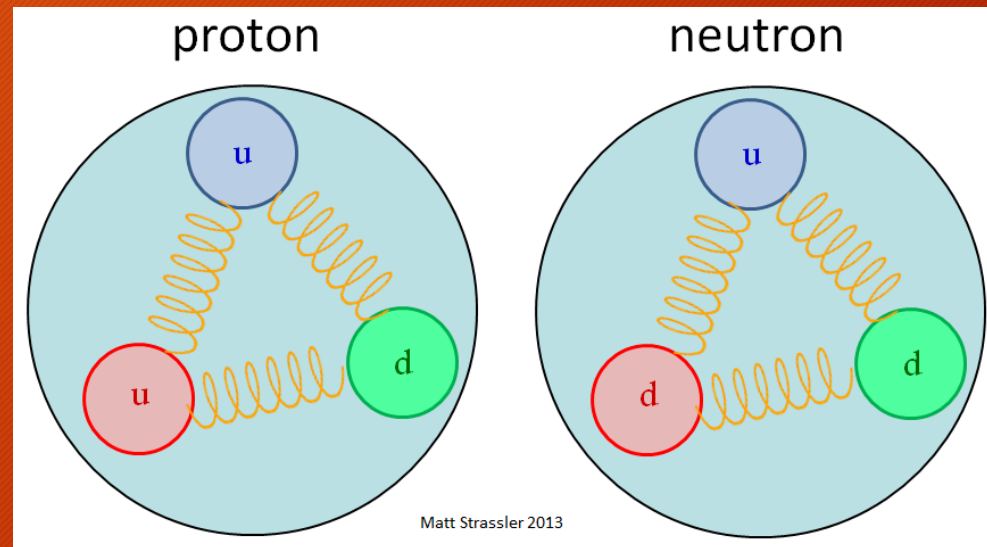
We need to know what Quarks are before we understand the strong force

- A quark is a type of elementary particle and a fundamental constituent of matter. Quarks combine to form composite particles (eg. Protons) called hadrons, the most stable of which are protons and neutrons, the components of atomic nuclei.

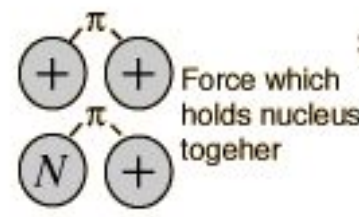
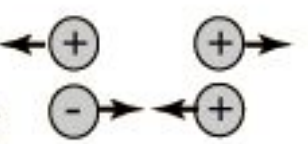
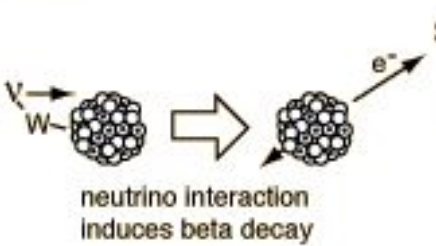



Strong Force.

- **Strong force**, a fundamental force of nature that acts between subatomic particles of matter. The strong force binds quarks to one another in clusters to make more familiar subatomic particles, such as Protons and neutrons.



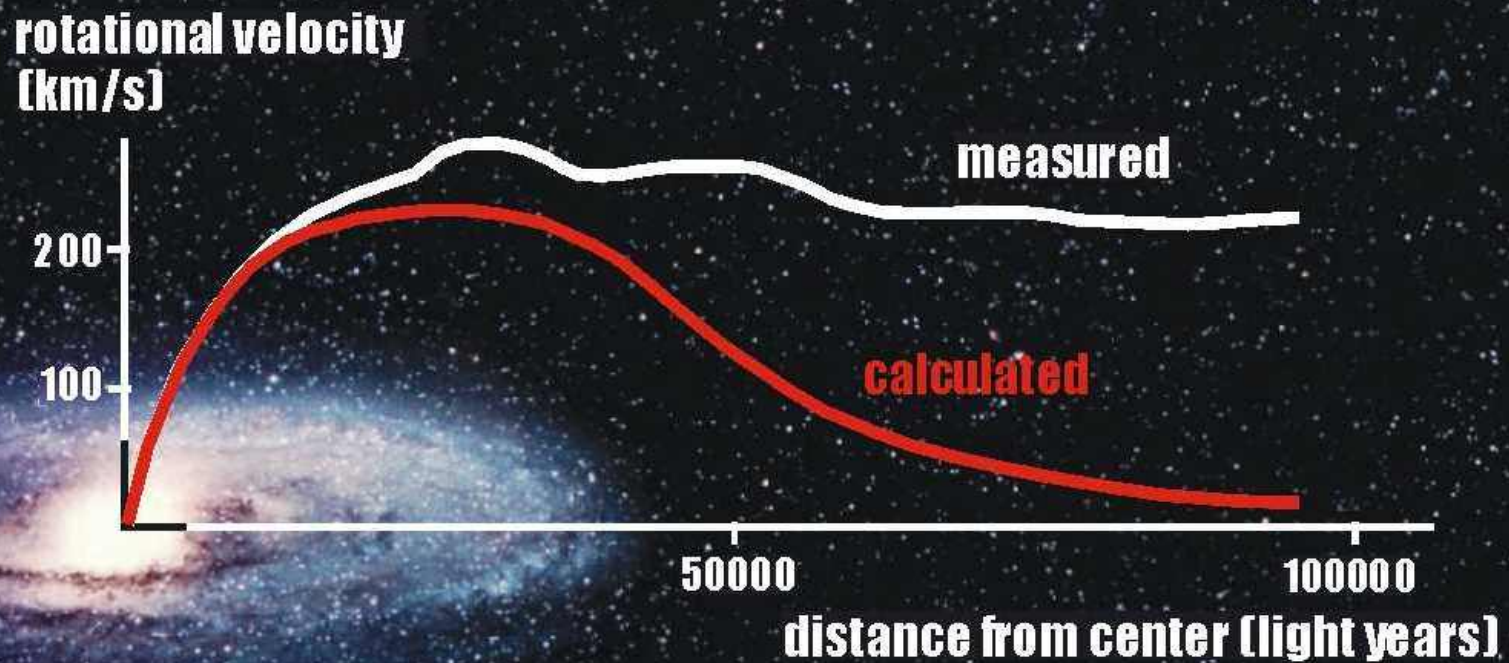
Fundamental Forces

<i>Strong</i>		Strength 1	Range (m) 10^{-15} (diameter of a medium sized nucleus)	Particle gluons, π (nucleons)
<i>Electro-magnetic</i>		Strength $\frac{1}{137}$	Range (m) Infinite	Particle photon mass = 0 spin = 1
<i>Weak</i>		Strength 10^{-6}	Range (m) 10^{-18} (0.1% of the diameter of a proton)	Particle Intermediate vector bosons W^+ , W^- , Z_0 , mass > 80 GeV spin = 1
<i>Gravity</i>		Strength 6×10^{-39}	Range (m) Infinite	Particle graviton ? mass = 0 spin = 2

Dark Matter

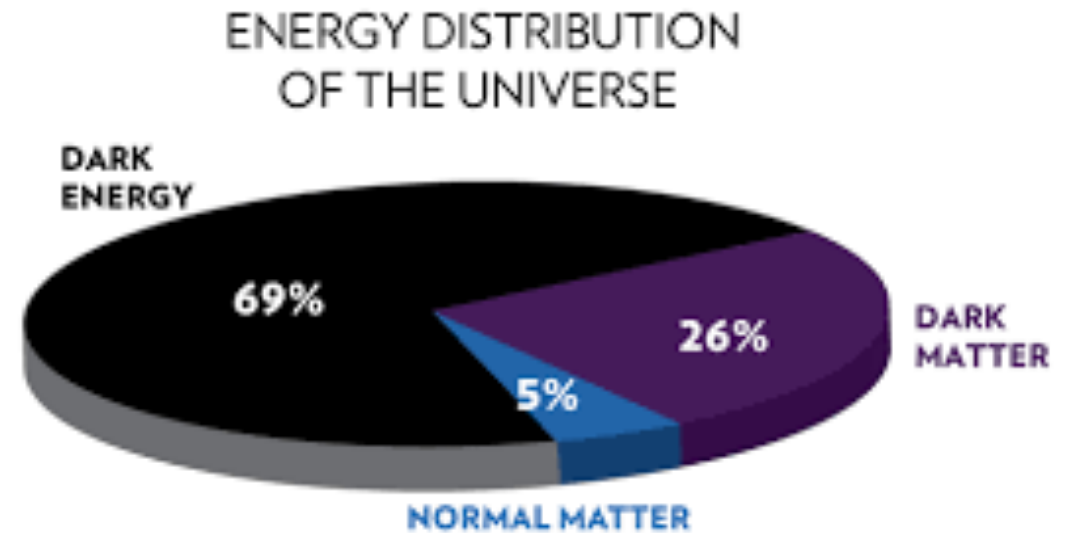
- **Dark matter** is a hypothetical form of matter that is thought to account for approximately 95% of the matter in the universe. The majority of dark matter is thought to be non-baryonic in nature, possibly being composed of some as-yet undiscovered subatomic particles.





What evidence do we have?

How much
do we really
know?



For more information on dark energy watch:

https://www.youtube.com/watch?v=QAa20_8wBUQ