The two largest pieces of the Universe, dark matter and dark energy, are the two that we know the least about, yet nothing less than the ultimate fate of the Universe will be determined by them.

**Dark Energy**
- Tends to drive the Universe apart.
- Results from viewing Type Ia supernovas have shown astronomers that the expansion of the Universe is accelerating and dark energy is the reason for the acceleration.
- If vacuum energy is correct, in about 100 billion years, no galaxy outside our own will be visible.

**Dark Matter**
- Tends to drive the Universe together.
- Evidence suggests that the mass of dark matter in galaxies, clusters of galaxies, and the Universe as a whole is about 5 or 6 times greater than the mass of ordinary baryonic matter such as protons and neutrons.

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Ever since the phenomenal success of Isaac Newton in explaining the motion of the planets with his theory of gravity and laws of motion in 1687, unseen matter has been invoked to explain puzzling observations of cosmic bodies.

**Big Bang**
- Present
- Future

**Big Rip**
- Constant
- Dark Energy
  - Tends to drive the Universe apart.

**Big Crunch**
- Dark Matter
  - Tends to drive the Universe together.

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The issue of whether dark matter exists or the theory of gravity needs to be modified will likely not be resolved until dark matter particles are detected, or ruled out by lack of detection.

Some physicists propose actually making dark matter.

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http://chandra.si.edu/learn_cosmology.html

www.nasa.gov