Probing Dark Energy with Galaxy Clusters

Composite images of galaxy clusters using X-ray data from Chandra (purple) and optical data from the Hubble Space Telescope and Sloan Digital Sky Survey (red, green, blue).

- These four galaxy clusters were part of a large survey of over 300 clusters used to investigate the properties of the dark energy that is presumed to drive the accelerated expansion of the universe.

- A new technique uses observations and theoretical modeling of the X-ray emission profiles of the outer reaches of galaxy clusters.

- These results support the idea that dark energy is best explained by the "cosmological constant," which Einstein first proposed and is equivalent to the energy of empty space.

Credit: NASA/CXC/Univ. of Alabama/A. Morandi et al; Optical: SDSS, NASA/STScI
Instrument: ACIS

Distance estimates in billions of light years (Gly):
- Abell 1835: 3.0 Gly
- MS 1455.0+2232: 3.1 Gly
- RXJ 1347.5-1145: 4.7 Gly
- ZWCL 3146: 3.3 Gly

Scale in arcmin & millions of light years (Mly):
- Abell 1835: 3.0 arcmin (2.3 Mly)
- MS 1455.0+2232: 3.3 arcmin (2.6 Mly)
- RXJ 1347.5-1145: 2.2 arcmin (2.5 Mly)
- ZWCL 3146: 2.5 arc min (2.1 Mly)