

# Galaxy observations show no change in fundamental physical constant (Forwarded)

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Galaxy observations show no change in fundamental physical constant  
By Robert Sanders, Media Relations

BERKELEY -- A fundamental number that affects the color of light emitted by atoms as well as all chemical interactions has not changed in more than 7 billion years, according to observations by a team of astronomers charting the evolution of galaxies and the universe.

The results are being reported today (Monday, April 18) at the annual meeting of the American Physical Society (APS) by astronomer Jeffrey Newman, a Hubble Fellow at Lawrence Berkeley National Laboratory representing DEEP2, a collaboration led by the University of California, Berkeley, and UC Santa Cruz. Newman is presenting the data, recorded by the DEIMOS spectrograph on the Keck II telescope in Hawaii, and an update on the DEEP2 project at a 1 p.m. EDT press conference at the Marriott Waterside Hotel in Tampa, Fla.

The fine structure constant, one of a handful of pure numbers that occupy a central role in physics, pops up in nearly all equations involving electricity and magnetism, including those describing the emission of electromagnetic waves -- light -- by atoms. Despite its fundamental nature, however, some theorists have suggested that it changes subtly as the universe ages, reflecting a change in the attraction between the atomic nucleus and the electrons buzzing around it.

Over the past few years, a group of Australian astronomers has reported that the constant has increased over the lifetime of the universe by about one part in 100,000, based on its measurements of the absorption of light from distant quasars as the light passes through galaxies closer to

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us. Other astronomers, however, have found no such change using the same technique.

The new observations by the DEEP2 survey team use a more direct method to provide an independent measure of the constant, and show no change within one part in 30,000.

"The fine structure constant sets the strength of the electromagnetic force, which affects how atoms hold together and the energy levels within an atom. At some level, it is helping set the scale of all ordinary matter made up of atoms," Newman said. "This null result means theorists don't need to find an explanation for why it would change so much."

The fine structure constant, designated by the Greek letter alpha,