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University of Miami, Physics Department Colloquium

Date: Wednesday, Nov 11, 2026
Time: 4:00 pm – 5:00 pm
Location: Physics Library – Rm 335, Knight Physics Building

Dark Energy Dynamics, Spatial Curvature, Neither, or Both?

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Abstract

Observations over the last two and half decades have persuaded cosmologists that (as yet only indirectly detected) dark energy is by far the main component of the energy budget of the current universe. I review a few simple dark energy models, including the currently-standard ΛCDM cosmological model, and compare their predictions to observational data, to derive cosmological parameter constraints and to study consistency of different data sets. I summarize observational constraints on dark energy dynamics and spatial curvature, two parameters that extend away from the time-independent cosmological constant dark energy and flat spatial hypersurfaces of the standard ΛCDM model. I also summarize observational constraints on the Hubble constant. I conclude with a list of my favorite open cosmological questions.

Biography



Professor Bharat Ratra, distinguished professor of physics, works in the areas of cosmology and astroparticle physics. He researches the structure and evolution of the universe. Two of his current principal interests are developing models for the large-scale matter and radiation distributions in the universe and testing these models by comparing predictions to observational data. In 1988, Ratra and Jim Peebles proposed the first dynamical dark energy model. Dark energy is the leading candidate for the mechanism that is responsible for causing cosmological expansion to accelerate. The discovery that cosmological expansion is accelerating is one of the most significant scientific discoveries of the last quarter of a century. Ratra joined Kansas State University in 1996 as an assistant professor of physics. He was a postdoctoral fellow at Princeton University, the California Institute of Technology, and the Massachusetts Institute of Technology. Ratra earned a doctorate in physics from Stanford University and a master's degree from the Indian Institute of Technology in New Delhi.