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Unveiling the darkness: Cosmology Through Euclid satellite

Tuesday, 9 July 2024 16:00 (30 minutes)

The current standard model of cosmology successfully describes a variety of measurements, but the nature of its main components, dark matter and dark energy, remains unknown. The Euclid mission will provide high-resolution optical imaging, along with near-infrared imaging and spectroscopy, covering approximately 14,000 square degrees of extragalactic sky. Euclid is optimized for two powerful and complementary probes: weak gravitational lensing and galaxy clustering. These are among the most sensitive tools for investigating dark energy and gravity on cosmological scales.
One of Euclid's primary goals is to constrain the dark energy equation of state, aiming for a figure of merit (FoM) greater than 400. Additionally, it seeks to measure the growth-index factor with a 1-sigma uncertainty of 0.02. The high-quality data from Euclid will also address the Hubble constant (H0) debate, as its primary probes will provide state-of-the-art constraints on the cosmological parameters of the baseline flat ΛCDM model, significantly reducing uncertainties on all these parameters. Euclid will also enhance our ability to test extensions of the standard cosmological model, such as improving constraints on the sum of neutrino masses. In this talk, I will highlight Euclid's key cosmological science cases and discuss the benefits of cross-correlating Euclid data with CMB observations to tighten parameter constraints and minimize systematic effects.

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Session Classification: The Euclid mission: current status, results from early observations, and future prospects