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Detection of early dark energy through the CMB rotation spectrum

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The latest distance ladder measurements have inferred a value of the Hubble factor inconsistent at ~4\sigma with the value that best fits the data from the PLANCK experiment. To ease the tension, an anomalous expansion of the universe due to early dark energy has been posited. A Pseudo Nambu-Goldstone boson, which begins oscillations at matter-radiation equality, is consistent with cosmological data. The coupling with the photon would generate cosmological birefringence that rotates the CMB polarization non-uniformly across the sky. The resulting rotation spectrum may be detected by a next generation of experiments. Its form could strongly distinguish different models.

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