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The CHASE laboratory search for chameleon dark energy

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A scalar field is a favorite candidate for the particle responsible for dark energy. However, few theoretical means exist that can simultaneously explain the observed acceleration of the Universe and evade tests of gravity. The chameleon mechanism, whereby the properties of a particle depend upon the local environment, is one possible avenue. I present the results of the Chameleon Afterglow Search (CHASE) experiment, a laboratory probe for chameleon dark energy. CHASE marks a significant improvement over other searches for chameleons both in terms of its sensitivity to the photon/chameleon coupling as well as its sensitivity to the classes of chameleon dark energy models and standard power-law models. Since chameleon dark energy is virtually indistinguishable from a cosmological constant, CHASE tests dark energy models in a manner not accessible to astronomical surveys.

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