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A simple parametrisation for coupled dark energy

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As an alternative to the popular parametrisations of the dark energy equation of state, we construct a quintessence model where the scalar field has a linear dependence on the number of e-folds. Constraints on more complex models are typically limited by the degeneracies that increase with the number of parameters. The proposed parametrisation conveniently constrains the dark energy equation of state as it allows for a wide variety of time evolutions. We also consider a non-minimal coupling to cold dark matter. We fit the model with Planck and KiDS observational data. The CMB favours a non-vanishing coupling with energy transfer from dark energy to dark matter. Conversely, gravitational weak lensing measurements slightly favour energy transfer from dark matter to dark energy, with a substantial departure of the dark energy equation of state from -1 .

Primary authors: DA FONSECA, Vitor (Institute of Astrophysics and Space Science at the Faculty of Science of the University of Lisbon); BARREIRO, Tiago (Instituto de Astrofísica e de Ciências do Espaço, FCUL); Dr NUNES, Nelson (Instituto de Astrofísica e de Ciências do Espaço, FCUL)

Presenter: DA FONSECA, Vitor (Institute of Astrophysics and Space Science at the Faculty of Science of the University of Lisbon)

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