

Abstract Submitted
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Fitting the Coupling Between Dark Energy and Dark Matter as Fields KEVIN LUDWICK¹, LaGrange College — Many parameterizations of couplings between dark energy (DE) and dark matter (DM) as fluids in the continuity equation have been studied in the literature, and observational data from the growth of perturbations can constrain these parameterizations. Instead, we present here a study of DE-DM coupling as fields, making use of the Boltzmann transport equation. This calculation required obtaining a distribution function for dark energy that leads to an equation of state parameter that is negative, which neither Bose-Einstein nor Fermi-Dirac statistics can supply. Treating dark energy as a quantum scalar field, we use adiabatic subtraction to obtain a finite analytic approximation for its distribution function that assumes the FLRW metric and nothing more. We present and examine our results for coupling via the graviton with no other explicit coupling in the Lagrangian. We then will fit the coupling parameter to supernovae and CMB data using COSMOMC.

¹My student will also be presenting an extension to my work, and if possible, I would like for his talk to be right after mine in my session. I am also chairing the one FECS session at the meeting, so I hope there will not be a scheduling conflict.

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