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Examining the Diffeomorphism Field as an Inflaton Candidate[1]
CHRISTOPHER DORAN, VINCENT RODGERS, WADE BLOOMQUIST, Univ. of Iowa Dept. of Physics & Astronomy; Iowa City, IA, KORY STIFFLER, Center for String and Particle Theory, University of Maryland; College Park, MD — We revisit the diffeomorphism field (or $D_{\mu\nu}$) Lagrangian interacting with the Friedman-Robertson-Walker-LeMaitre metric, as derived by Rodgers and Yasuda (2006). This Lagrangian suggested a natural origin of both the inflaton, as the trace component of $D_{\mu\nu}$, and dark matter fields as the remaining traceless rank-two tensor. We follow up on the previous calculations that demonstrated several e-foldings of cosmic inflation and dark-energy-like behavior. A $D_{\mu\nu}$ solution as a source of inflation is interesting for several reasons. It has a non-canonical kinetic Lagrangian with four derivatives in the highest-order term and its structure is fairly unique among k-inflation theories. Also, its full interacting formulation shows it to interact with a point particle in a manner that is similar to $R_{\mu\nu}$. We numerically integrate the classical field equations in order to find a region of parameter space where the resulting cosmological data make sense, including a more realistic number of e-foldings. With this we hope to illuminate the post-inflation, radiation-era interaction of $D_{\mu\nu}$ with a radiation field like the CMB, in order to see what observational effects there would be.

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