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Failures of homogeneous and isotropic cosmologies in Extended Quasi-Dilaton Massive Gravity

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We analyze the Extended Quasi-Dilaton Massive Gravity model around a Friedmann-Lemaitre-Robertson-Walker cosmological background. We present a careful stability analysis of asymptotic fixed points. We find that the traditional fixed point cannot be approached dynamically, except from a perfectly fine-tuned initial condition involving both the quasi-dilaton and the Hubble parameter. A less-well examined fixed-point solution, where the time derivative of the 0-th Stuckelberg field vanishes $\dot{\phi}^0 = 0$, encounters no such difficulty, and the fixed point is an attractor in some finite region of initial conditions. We examine the question of the presence of a Boulware-Deser ghost in the theory. We show that the additional constraint which generically allows for the elimination of the Boulware-Deser mode is *only* present under special initial conditions. We find that the only possibility corresponds to the traditional fixed point, and the initial conditions are the same fine-tuned conditions that allow the fixed point to be approached dynamically.

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