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Inflation with massive spin-2 ghosts

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It is well-known that renormalizable theories of quadratic gravity pose a risk to unitarity of the S-matrix due to the spin-2 ghost degrees of freedom that they inevitably propagate. However, in recent years, a few promising methods to guarantee unitarity in the presence of these ghosts have been proposed. In light of these recent developments, we consider a generic model of quadratic gravity coupled to a single scalar and investigate the effects of gravitational degrees of freedom on inflationary parameters. We find that quantum corrections arising from the massive spin-2 ghost generate significant contributions to the effective inflationary potential and allow for a realization of the spontaneous breakdown of global scale invariance without the need for additional scalar fields. We compute inflationary parameters, compare the resulting predictions to well-known inflationary models, and find that they fit well within the Planck and BICEP/Keck collaboration's constraints on inflation.

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