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Inflation in Metric-Affine Quadratic Gravity

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In the general framework of Metric-Affine theories of gravity, where the metric and the connection are independent variables, we consider actions quadratic in the Ricci scalar curvature and the Holst invariant (the contraction of the Riemann curvature with the Levi-Civita antisymmetric tensor) coupled non-minimally to a scalar field. We study the profile of the equivalent effective metric theory, featuring an extra dynamical pseudoscalar degree of freedom, and show that it reduces to an effective single-field inflationary model. We analyze in detail the inflationary predictions and find that they fall within the latest observational bounds for a wide range of parameters, allowing for an increase in the tensor-to-scalar ratio. The spectral index can either decrease or increase depending on the position in parameter space.

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