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The Strong Scalar Backreaction in non-Abelian Axion-Gauge Inflation

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Chromo-natural inflation (CNI), coupling a pseudo-scalar axion-inflaton to $SU(2)$ gauge fields, supports interesting signatures—from chiral primordial gravitational waves to large tensor non-Gaussianities and primordial black holes.

In its spectator variant (SCNI), the Chern-Simons coupling between axion and gauge sectors impacts observables even if the axion does not drive inflation. A spectator axion may help alleviate tensions with CMB observations. Crucially, in the SCNI context, the evolution of the gauge mass parameter m_Q may lead to a robust scalar backreaction, shaping the background evolution and enhancing the primordial gravitational wave spectrum.

I present the first numerical study isolating and analyzing the impact of scalar backreaction on the background equations, revealing novel effects on the gravitational wave spectrum and providing new insights into the model's dynamics.

The detectability of the corresponding signatures is also briefly discussed.

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