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Nonlinear mixing of vacuum tensor modes during inflation

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The recent observation of a gravitational wave background by the NANOGrav collaboration has generated excitement about the possible future detection of primordial gravitational waves. Gravitational waves can be generated by a number of processes during inflation, and their correlation functions can be used to tightly constrain the vast space of inflationary models. But in order to calculate correlation functions for the most chaotic generation mechanism, we must include higher-order dynamics in our analysis. I use the numerical relativity code GRChombo code to study nonlinear mixing between scalar and tensor modes during inflation. We will initialise both the inflaton and the metric with vacuum fluctuations, evolve these fields forward to the freeze-out time and extract their two and three point correlation functions. These results can then be used to study the effect of enhanced gravitational-wave production on the shape of the primordial bispectrum.

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