

Abstract Submitted  
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**Cosmological Inflation: Testing Initial Conditions of Inhomogeneous Inflation Fields** AUBERRY FORTUNER, PLU — The cosmological model explains how the expansion of the Universe is determined by the energy density, yet suffers from some limitations that can be overcome only if the Universe began under very specific conditions. The theory of inflation was proposed to solve these problems by introducing a period of rapid expansion in the early Universe. The mechanism that causes inflation is the evolution of a scalar field, which determines the energy density and expansion of the Universe. The evolution of the scalar fields depends on the type of field and the initial conditions we give it. Scalar fields that are flat and smooth generally cause inflation, yet scalar fields that fluctuate may delay or prevent inflation under certain initial conditions by introducing an additional energy density. Our research investigated the range of initial conditions for two models of inhomogeneous scalar fields that allow inflation to occur. The equation of motion of the scalar fields were solved numerically allowing us to determine the amount of expansion that results from each set of initial conditions, and whether or not inflation occurs.

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