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Enlarging the Space of Viable Inflation Models: A Slingshot Mechanism

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The viability of a given model for inflation is determined not only by the form of the inflaton potential, but also by the initial inflaton field configuration. In many models, otherwise well-motivated inflaton field configurations fail to induce inflation, or fail to produce sufficient inflation to solve the horizon problem. In this talk, we propose a mechanism which enables inflation to occur even with such initial conditions. This mechanism involves multiple scalar fields which experience a time-dependent mixing. This in turn leads to a “re-overdamping” phase as well as a parametric resonance which “slingshots” the inflaton field from regions of parameter space that fail to induce inflation to regions that do. Our mechanism is flexible, dynamical, and can easily yield an inflationary epoch of sufficiently long duration. This slingshot mechanism can therefore be utilized in a variety of settings and thereby enlarge the space of potentially viable inflation models.

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