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Primordial Black Holes Arise When The Inflaton Falls

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Primordial Black Holes (PBHs) have entered the forefront of theoretical cosmology, due their potential role in phenomena ranging from gravitational waves, to dark matter, to galaxy formation. While producing PBHs from inflationary fluctuations naively would seem to require a large deceleration of the inflaton from its velocity at the horizon exit of CMB scales, in this talk we demonstrate that an acceleration from a relatively small downward step in the potential that is transited in much less than an e-fold amplifies fluctuations as well. Depending on the location of the step, such PBHs could explain dark matter or the black holes detected by the gravitational wave interferometers. The perturbation enhancement has a natural interpretation as particle production due to the non-adiabatic transition associated with the step.

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