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Far-from-equilibrium dynamics of axion-like particles with broken shift symmetry

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Axion-like particles (ALPs) play an important role in cosmology and, among others, are well motivated dark matter candidates. In the presence of a monodromy the discrete shift symmetry of ALPs can be broken, and this talk is devoted to the rich nonlinear dynamics that becomes available in such systems. We consider coherent oscillations of the field, which trigger the resonant amplification of fluctuations, leading to the fragmentation of the field. In many cases the ALP potential contains several local minima and we study how the energy transfer to the fluctuations impacts the transitions between local minima. The production of stochastic gravitational wave background from the dynamics, potentially within reach of future detectors, is also investigated.

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