Numerical Simulation of the Axion Field through the QCD Phase Transition

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We perform a full (3+1)-dimensional numerical simulation of the axion field around the QCD epoch. Our aim is to fully resolve large dynamical non-linear effects in the inhomogenous axion field. These effects are important as they lead to large overdensities in the field at late times. Those overdensities will eventually evolve into axion minicluster, which have various phenomenological implications like microlensing events. It is therefore important to have a reliable estimate of the number of overdensities and their mass relation.

Summary

We perform a full (3+1)-dimensional numerical simulation of the axion field around the QCD epoch to obtain reliable estimates for axion miniclusters.

Primary authors: Prof. SAFDI, Benjamin (University of Michigan); Mr FOSTER, Joshua (University of Michigan); BUSCHMANN, Malte (University of Michigan)

Presenter: BUSCHMANN, Malte (University of Michigan)

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