IWARA

From Quarks to Cosmos

Contribution ID: **81**   Type: **Poster (virtual)**

A code that solves the Schrodinger-Poisson-Euler system with periodic boundary conditions

We present a code that simultaneously solves the Schrödinger-Poisson (SP) system together with the Euler equations. We have developed a tool that allows the study interation between the scalar dark matter described by the SP system weakly coupled to the luminous matter modeled by the Euler equations through the Poisson equation using periodic boundary conditions in each of the system components. We describe the numerical methods used together with convergence tests in some simple scenarios. The boundary conditions in these simulations play a very important role since depending on the type of condition used, it can lead to different density profiles outside a galactic core. Our code uses periodic boundary conditions which allow the formation of core-halo structures.

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