



Contribution ID: 95

Type: 5 min talk

Vortex Stability in Ultralight Scalar Solitons

Tuesday, 17 September 2024 16:25 (5 minutes)

Galaxies and their dark-matter haloes are commonly presupposed to spin. But it is an open question how this spin manifests in haloes and soliton cores made of scalar dark matter (SDM, including fuzzy/wave/ultralight-axion dark matter). One way spin could manifest in a necessarily irrotational SDM velocity field is with a vortex. But recent results have cast doubt on this scenario, finding that vortices are generally unstable except with substantial repulsive self-interaction. We introduce an alternative route to stability: in both (non-relativistic) analytic calculations and simulations, a black hole or other central mass at least as massive as a soliton can stabilize a vortex within it. This conclusion may also apply to stellar-scale Bose stars.

Primary author: MIRASOLA, Anthony (University of Illinois Urbana-Champaign)

Co-authors: Prof. PRESCOD-WEINSTEIN, Chanda (University of New Hampshire); Dr NEYRINCK, Mark (Ikerbasque, the Basque Foundation for Science); Dr MUSOKE, Nathan (University of New Hampshire)

Presenter: MIRASOLA, Anthony (University of Illinois Urbana-Champaign)

Session Classification: Afternoon 2