

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Boson Star from Repulsive Light Scalars and Gravitational Waves*

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Brown

We study properties of boson stars consisting of ultra-light scalar dark matter with repulsive self-interactions. We investigate the origin of the maximum mass of spherically symmetric stable stars which emerges only when solving the full equations of motion in curved space-time, but not when solving the approximated Schrodinger-Newton equations. When repulsion is weak, the backreaction of the curvature on the scalars acts as an additional source of attraction and can overcome the repulsion, resulting in a maximum star mass and compactness. We also point out that the potential in a UV completed particle physics model of light scalar dark matter is generally more complicated than the widely used  $\phi^4$  interaction. Additional interactions beyond  $\phi^4$  in the potential can dramatically change the properties of boson stars as well as modify the prospect of LIGO gravitational wave detection for binary mergers of boson stars.

Wednesday, October 30, 2019, 2:30 pm

Cosman Seminar Room

Center for Theoretical Physics

Building 6C, Room 6C-442

Massachusetts Institute of Technology

Refreshments at 2:00 in the same room