

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Exact solutions to relativistic compact objects in extended theories of gravity*

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My talk will focus on a formalism developed to find analytical, physically viable solutions to the Tolman-Oppenheimer-Volkoff (TOV) equations within an extended gravity framework. This is based on my work, arXiv:2403.00070, and the brief summary of our results is as follows: Considering models with a quadratic correction to the Einstein-Hilbert action, the solutions describe (1) a quasi-isotropic stellar object with a shell and double-layer structure analogous to a dipole distribution, and (2) a smooth configuration characterized by a quartic correction to a quadratic Newtonian potential with a baryonic matter profile that is standard with respect to other known solutions of the TOV equations. These findings indicate that analytical approaches can effectively describe astrophysical phenomena in the context of extended theories of gravity. Furthermore, the structural and compositional distinctions observed in these relativistic stars compared to standard general relativity suggest measurable differences that could emerge with future observational advances.

**Tuesday, February 25, 2025, 2:30 pm**  
**Cosman Seminar Room**  
**Center for Theoretical Physics**  
**Building 6C, Room 6C-442**  
**Massachusetts Institute of Technology**