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Fermion soliton stars

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A real scalar field coupled to a fermion via a Yukawa term can evade no-go theorems preventing solitonic solutions. For the first time, we study this model within General Relativity without approximations, finding static and spherically symmetric solutions describing fermion soliton stars. The Yukawa coupling provides an effective mass for the fermions, which is key to the existence of self-gravitating solutions. I will present this novel family of star solutions and describe their mass-radius diagram and maximum compactness. Besides, I will discuss the ranges of the parameters of the fundamental theory in which the latter might have interesting astrophysical implications. Finally, I will highlight how these results may hint towards the existence of classical gravitational solitons in the standard model.

Topic Field

Gravity

Faculty position

PhD student

Primary author: DEL GROSSO, Loris (La Sapienza University of Rome)

Co-authors: PANI, Paolo (Istituto Nazionale di Fisica Nucleare); URBANO, Alfredo Leonardo (Istituto Nazionale di Fisica Nucleare); FRANCIOLINI, Gabriele (Istituto Nazionale di Fisica Nucleare)

Presenter: DEL GROSSO, Loris (La Sapienza University of Rome)