



## Axions in neutron stars: cooling bounds beyond the nucleonic core composition

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**Abstract:** Neutron stars are exceptional laboratories for axion physics, since their thermal evolution can be strongly affected by the production of weakly interacting particles in the stellar core. Cooling observations have therefore been used to place bounds on the axion-nucleon coupling.

In this seminar, I will discuss how cooling limits can be revisited once the dense-matter composition and the equation of state are treated consistently. I will present the main approach for constructing neutron star matter for this work: the MUSES Calculation Engine, and I will show how different core compositions (EoS for nucleonic matter, EoS including hyperons and  $\Delta$  resonances) can modify both the stellar structure and the cooling evolution. I will then discuss the impact this has on limits derived from cooling evolution for the main invisible QCD axion models.

Martes, 28 de abril de 2026, 15:00 horas, seminario de Física Nuclear

[On-line](#)



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