

Getting the most on Supernova axions

Thursday, 18 January 2024 15:20 (20 minutes)

In this talk I will discuss how Supernovae (SN) can be exploited to severely constrain the parameter space of axion-like-particles (ALPs) coupled to nucleons. In particular, I will provide a continuous extension of the ALP emission rates to the case of strong nuclear couplings, in which they could enter the trapping regime. This approach allowed us to extend the usual cooling bound on nucleophilic ALPs from the case of weak coupling regime to the case of strong nuclear couplings. Furthermore, strongly coupled ALPs would have given rise to a signal in the Kamiokande II water Cherenkov detector. The non observation of this signal allows the introduction of a complementary constraints. Thus, the combination of this two arguments prevents the possibility for future cosmological surveys to detect any signatures of the QCD axion mass.

Primary author: LELLA, Alessandro (Istituto Nazionale di Fisica Nucleare)

Co-authors: MIRIZZI, Alessandro (Istituto Nazionale di Fisica Nucleare); Prof. CO', Giampaolo (LE); LUCENTE, Giuseppe (Istituto Nazionale di Fisica Nucleare); Dr GIANNOTTI, Maurizio; CARENZA, Pierluca; RAUSCHER, Thomas (University of Basel & University of Hertfordshire)

Presenter: LELLA, Alessandro (Istituto Nazionale di Fisica Nucleare)