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## Getting the most on supernova bounds on axions

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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 ALPs 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 from the weak coupling regime to the case of strong nuclear couplings. Furthermore, nucleophilic ALPs could 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 constraint. Thus, the combination of this two arguments prevents the possibility for future cosmological surveys to detect any signatures of the QCD axion mass.

**Auteur principal:** LELLA, Alessandro (Istituto Nazionale di Fisica Nucleare (INFN), "Aldo Moro" University in Bari)

**Orateur:** LELLA, Alessandro (Istituto Nazionale di Fisica Nucleare (INFN), "Aldo Moro" University in Bari)

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