

Characterization of massive ALP emissivity from a core-collapse Supernova

ALPs could be copiously emitted during a supernova explosion by means of nuclear processes. The two main processes for axion production in a nuclear medium are nucleon-nucleon Bremsstrahlung $N+N \rightarrow N+N+a$ and pionic Compton-like processes $\pi^-+p \rightarrow n+a$. The aim of the work is to extend the results already present in the previous literature to the case of massive axions, considering corrections due to finite masses up to 300 MeV. The results obtained, will be exploited to extract the cooling bound on the axion-nucleon coupling g_{aN} in this range of masses. Moreover, this approach enables us to study the effects on emission due to gravitational trapping. Assuming that gravitationally trapped axions decay into photons, we also estimated a bound on their coupling with photons.

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