Contribution ID: **9** Type: **Talk**

Constraining heavy axion-like particles by energy deposition in Globular Cluster stars

Monday 8 August 2022 16:52 (3 minutes)

Heavy axion-like particles (ALPs), with masses up to a few 100 keV and coupled with photons can be efficiently produced in stellar plasmas, contributing to a significant energy-loss. This argument has been applied to helium burning stars in Globular Clusters (GCs) to obtain stringent bounds on the ALP-photon coupling g_aγ. However, for sufficiently large values of the ALP mass and coupling to photons, one should expect a significant fraction of ALPs to decay inside the star. These ALPs do not contribute to the energy loss but rather lead to an efficient energy transfer inside the star. We present a new ballistic recipe that covers both the energy-loss and energy-transfer regimes and we perform the first dedicated simulation of GC stars including the ALP energy transfer. This argument allows us to constrain ALPs with m_a⪆0.4 MeV and g_aγ⪆10^−5 GeV^-1, probing a section of the ALP parameter space informally known as “cosmological triangle”. This region is particularly interesting since it has been excluded only using standard cosmological arguments that can be evaded in nonstandard scenarios.

Primary authors: CARENZA, Pierluca (Stockholm University, Oskar Klein Centre); Dr LUCENTE, giuseppe (INFN Bari); Prof. STRANIERO, Oscar; Prof. MIRIZZI, Alessandro; Prof. GIANNOTTI, Maurizio

Presenter: CARENZA, Pierluca (Stockholm University, Oskar Klein Centre)

Session Classification: Poster Lightning Talks