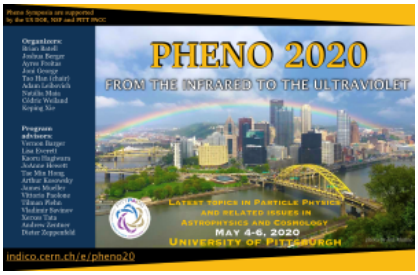

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Axion Constraints from Quiescent Soft Gamma-ray Emission from Magnetars

Monday 4 May 2020 15:00 (15 minutes)

Axion-like-particles (ALPs) emitted from the core of magnetars can convert to photons in their magnetospheres. We study such emissions in the soft-gamma-ray range (300 keV to 1 MeV), where the ALP spectrum peaks and astrophysical backgrounds from resonant Compton upscattering are expected to be suppressed. Using published quiescent soft-gamma-ray flux upper limits (ULs) in 6 Magnetars obtained with *CGRO* COMPTEL, *INTEGRAL* SPI/IBIS/ISGRI and the *Fermi* Gamma Ray Burst Monitor (GBM), we put limits on the ALP-photon coupling obtained from conversions, assuming that ALP emission from the core is just sub-dominant to bounds from neutrino cooling. For core temperatures (T_c) of 10^9 K, the constraints on the ALP-photon coupling coming from 1E 2259+586 and J170849.0-400910 are better than the current limits obtained from the CAST experiment. We show the dependence of our results on the magnetar core temperature. Our results motivate a program of studying quiescent soft-gamma-ray emission from magnetars with the *Fermi*-GBM.

Summary

Axion-like-particles (ALPs) emitted from the core of magnetars can convert to photons in their magnetospheres. We study such emissions in 6 magnetars in the soft-gamma-ray range (300 keV to 1 MeV) and put limits on the ALP-photon coupling exceeding those obtained by the CAST experiment.

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