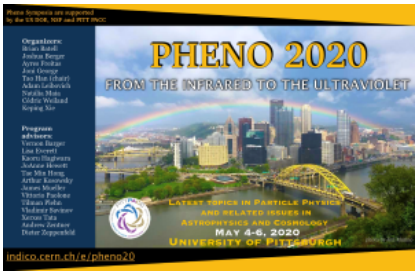

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X-ray Searches for Axions

Monday 4 May 2020 14:45 (15 minutes)

Axions are a generic expectation in many extensions of the Standard Model. Astrophysical objects have long been used to search for axions through, for example, cooling of white dwarfs or neutron stars. In these objects, axions can be created through scattering processes in the core and escape the star. However, the emitted axions can then be detected in X-ray observations if they convert into an X-ray photon on the way to Earth, either in the magnetosphere of the star or in the galactic magnetic fields. Here I present a summary of recent works searching for evidence of these particles from X-ray observations of white dwarfs, neutron stars, and late-stage massive stars. In particular, I focus on the recent discovery of an excess from nearby isolated neutron stars consistent with the axion expectation for an axion with the product of photon and nucleon couplings $g_{a\gamma\gamma}g_{ann} = 4.7 \times 10^{-21}$ GeV^{-1} and mass $m_a < 10^{-5}$ eV. I discuss a variety of followup efforts to further characterize the nature of the excess.

Summary

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