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Neutron Stars as Axion Laboratories

Thursday 21 July 2022 15:00 (20 minutes)

The electromagnetic interactions of axions can be dramatically enhanced in the magnetospheres of neutron stars as a result of the large magnetic fields and the dilute plasma. In this talk I will discuss the various processes which can give rise to distinct signatures of axions in these environments; this includes: (1) the resonant transition of axion dark matter to nearly monochromatic radio photons, (2) the production of axions from the plasma dynamics in the polar caps of neutron stars, and (3) the generation and implications of axion bound states. I will conclude by highlighting recent efforts on the observational side, which have led to world-leading limits on micro-eV scale axion dark matter.

Author: WITTE, Samuel

Presenter: WITTE, Samuel

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