

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Axion Production in Pulsar Magnetosphere Gaps*

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Axions and other pseudoscalar particles couple to electromagnetism through the  $E \cdot B$  operator. This coupling is responsible for interconversion between axions and photons as well as production of axions by electromagnetic fields. In this talk I will show that pulsars are very efficient axion factories. Pulsar magnetospheres admit non-stationary vacuum gaps that are characterized by large  $E \cdot B$ . These gaps play an important role in plasma generation, electromagnetic wave emission and, as I will discuss, axion production. The local density of axions produced in gaps can exceed the ambient dark matter density by several orders of magnitude. A fraction of these axions may convert to photons, giving rise to broadband radio signals. Dedicated observations of nearby pulsars with radio telescopes and interferometers can probe axion-photon couplings that are a few orders of magnitude lower than current astrophysical bounds. I will also comment on other astrophysical/cosmological settings that can source axions through the  $E \cdot B$  operator.

**Tuesday, February 8, 2022, 2:30 pm**

Zoom link will be distributed to joint cosmology seminar mailing list. See <https://cosmos.phy.tufts.edu/mailman/listinfo/cosmology-seminar> to join.

**Massachusetts Institute of Technology**