

## BSM physics with magnetars and neutron star mergers

*Thursday 20 May 2021 11:30 (30 minutes)*

The dense nuclear matter present in neutron star cores as well as the remnant of a neutron star merger may serve as an ideal environment for the production of axions or other BSM particles. In this presentation I will review two topics: the possible signals of axions in the photon spectrum of magnetars and the role of BSM particles in neutron star mergers. Axions may be produced in the interior of a magnetar and then escape the magnetar, turning into photons in the magnetosphere with some efficiency as a consequence of the Primakoff effect. I will review results which use this axion-induced photon spectrum to constrain the coupling of the axion to nucleons and photons. In the second part of the talk, I will discuss calculations of the axion mean free path in hot, dense nuclear matter that show that axions are not trapped in mergers, and instead cool down the system as they are emitted. On the other hand, other BSM particles could still be trapped in mergers, and would perhaps contribute to evening out temperature gradients in the interior of the merger.

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