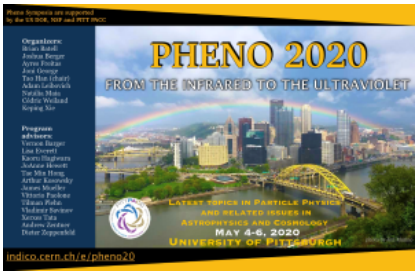


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# Axion cooling of neutron star mergers

*Monday 4 May 2020 15:30 (15 minutes)*

Axions may be produced in nuclear matter via neutron bremsstrahlung. We calculate the mean free path of axions in neutron star merger conditions, and find that axions created in a merger would free-stream through it, leading to cooling of the merger. We calculate the emissivity of axions over a wide range of temperatures, densities, and axion-neutron coupling constants, and translate that into a characteristic cooling time due to axion emission. We find that in certain thermodynamic conditions, axion emission could cool nuclear matter in timescales less than ten milliseconds, which makes axion cooling relevant for neutron star mergers.

## Summary

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