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## Electromagnetic radiation from axion condensates in a time dependent magnetic field

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Axions produced in the early universe can form bound clumps of Bose Einstein condensates, which are in some cases well described by a classical field with a single dominant angular frequency, close to the axion mass. In the vicinity of external electromagnetic fields, these axion clumps will start to radiate energy due to the axion-photon coupling. We will here consider the electromagnetic radiation from axion condensates in the background of an alternating magnetic field, such as the ones found around rotating neutron stars, orbiting binaries and merging neutron stars. We find that a resonant peak in radiation can occur when the frequency of the alternating magnetic field is comparable to the axion mass scale. More interestingly, in situations where the frequency of the alternating magnetic field itself changes with time, as can be the case in binary mergers due to steady increase in orbital frequency, the resonant peak in radiation may occur for a range of axion mass scales scanned by the time-varying magnetic field frequency.

### Collaboration name

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