

The search for an Axion Dark Matter Signature using Radio Telescopes

Monday 3 June 2019 12:40 (20 minutes)

Next generation telescopes such as the Square Kilometre Array (SKA) present an exciting opportunity for radio astronomy to contribute to the search for dark matter. Using the theory initially set out by Sikivie 1983 we investigate axion conversion in the magnetic fields that pervade spiral galaxies, galaxy clusters and around dense objects such as neutron stars. I will present the strength of the expected axion signature for a range of sources, the sensitivity of this signal to the structure of the magnetic field, the different challenges presented by resonant and non-resonant conversion, and the shape of the associated spectral profiles. We find that the observation of non-resonant axion conversion in particular presents a significant challenge, principally due to the large discrepancy between the scale of astrophysical magnetic fields and that required for axion conversion, but that the observation of nearby neutron stars may offer an opportunity to rule out new regions of parameters space.

Primary author: Ms KELLEY, Katharine (ICRAR-UWA)

Presenter: Ms KELLEY, Katharine (ICRAR-UWA)

Session Classification: Morning 12