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Probing axion dark matter with radio waves

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Axions with masses around μeV could account for dark matter in the universe. However, their small couplings with SM particles make it demanding to detect their signatures. In the presence of background photons, the decay rate of an axion to two photons is increased due to Bose enhancement, which could enhance the decay rate by a factor of millions. In this talk, we will discuss axion decays stimulated by background Galactic, extra-Galactic, and CMB photons and the possibility of detecting their decay products, radio photons, by the Square Kilometre Array. We compute the signal-to-noise ratio in all directions in the sky to estimate the best direction to observe for two realistic axion dark matter profiles, the Navarro-Frenk-White profile and the Burkert profile.

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