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## Hunting for Relativistic Axions with the Square Kilometer Array

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Axion-like particles (ALPs) are weakly interacting particles that are predicted to exist by many beyond standard model theories. A large number of experiments have been constructed or are under construction to search for these ALPs both directly and indirectly (through astrophysical or cosmological observations). In this work we have studied how photon signals originating from the oscillation of relativistic ALPs, produced from the decay of a cosmologically stable scalar DM of mass  $10^{-7} - 10^{-2}$  eV inside a dwarf spheroidal galaxy (dSph), can be detected by the upcoming radio telescope Square Kilometer Array (SKA). We show that observation of dSphs with the SKA can help us put strong bounds on the ALP-photon coupling in the ALP mass range  $m_a < 10^{-12}$  eV. We further show, for a fixed ALP mass and coupling, SKA observation can also help us put bounds in the DM mass vs lifetime parameter space, thus opening up a new avenue in the indirect detection of DM.

**Primary authors:** Dr KAR, Arpan (Center for Quantum Spacetime and Department of Physics, Sogang University); Prof. ZUPAN, Jure (Department of Physics, University of Cincinnati); Prof. ROY, Sourov (School of Physical Sciences, Indian Association for the Cultivation of Science); KUMAR, Tanmoy (Indian Association for the Cultivation of Science)

Presenter: KUMAR, Tanmoy (Indian Association for the Cultivation of Science)

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