

Axions in the galactic centre

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As experiments continue to narrow the viable WIMP parameter space, axions have become an increasingly popular candidate for dark matter. The nature of the axion coupling to the Standard Model makes them far more difficult to constrain, especially in the mass ranges usually considered for cold dark matter. So far, astrophysical experiments have struggled to place strong limits on such axions. In this work we will consider if the stimulated decay of axions, producing spectral lines, near Sagittarius A* provides more powerful constraints. This is done by leveraging models for the “spiked” dark matter density profile near black holes as well as the reported radio flux around the galactic centre. For density profiles compatible with recent studies of the presence of a spike, we determine sensitivity projections for SKA, MeerKAT, and SKA VLBI. These are up to two orders of magnitude better than previous estimates for the SKA.

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