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## A dark matter origin of the extragalactic radio background

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Observations by ARCADE-2 and other telescopes have reported an excess in the isotropic radio background. This excess has a hard spectral index and is found to significantly exceed the expected contribution from known astrophysical sources. Specifically, previous works have suggested that the ARCADE-2 signal is unusually smooth, compared to emission which traces large scale structure. In this talk, we will discuss scenarios in which the ARCADE-2 data can be explained via the annihilation of dark matter particles. We compute flux and anisotropy of the annihilation signals from dark matter halos and find that with assumptions of strong magnetic fields and extended substructure in massive clusters, dark matter models can produce small anisotropies that remain consistent with observational constraints. We also show that the above assumptions can be significantly relaxed in an alternative scenario where electrons can be efficiently reaccelerated by Alfvén waves in the intra-Cluster medium. Our analysis suggests that any source capable of explain the extragalactic radio excess must be more extended than typical for baryons in galaxies, hinting at a novel physics interpretation.

### Collaboration

– not specified –

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