

The Extragalactic Radio Background from Dark Matter Annihilation and the ARCADE-2 Excess

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Observations of the ARCADE-2 and other telescopes have reported a significant isotropic emission spanning from 22 MHz to 10 GHz. The intensity of this signal significantly exceeds the expected contribution from known astrophysical sources, and the distribution of the signal is suggested to be unusually smooth compared to emission which traces large scale structure. In this talk, we investigate the extragalactic radio background from dark matter annihilation and its possible connection to the ARCADE-2 excess signal. We show that with assumptions of strong magnetic fields and extended substructure in massive clusters, dark matter models can explain both intensity and spectrum of the ARCADE-2 excess, while produce small anisotropies that remain consistent with observational constraints. We also demonstrate that the above constraints could be significantly relaxed in an alternative scenario where electrons from the annihilation could be re-accelerated by turbulence in the intra-cluster medium.

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