

Dark matter minihalos from primordial magnetic fields

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Primordial magnetic fields (PMF) can enhance baryon perturbations on scales below the photon mean free path. However, a magnetically driven baryon fluid becomes turbulent near recombination, thereby damping out baryon perturbations below the magnetic Jeans length. In this Letter, we show that the initial growth in baryon perturbations gravitationally induces growth in the dark matter perturbations, which are unaffected by turbulence and eventually collapse to form $10^{-11} - 10^3 M_{\odot}$ dark matter minihalos. If the magnetic fields purportedly detected in the blazar observations are causally generated PMFs with a Batchelor spectrum, then such PMFs could potentially produce dark matter minihalos.

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