

Abstract Submitted
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Dark matter and electrons in the early Universe DIMPLE SARNAAIK, DAVID NGUYEN, VERA GLUSCEVIC, Univ of Southern California — We explore the possibility of dark matter and electron interactions in the early Universe using the temperature, polarization, and lensing anisotropy of Planck measurements. No evidence of such interactions was found and thus we report an upper bound for the cross section of these interactions if they exist. We analytically estimated the upper limits of cross-sections for electron-dark matter particle interactions. This gave us an approximate idea of where the upper limits of these interactions lie, allowing us to accurately sample over that region of parameter space. We tested dark matter masses between 1 keV- 1 TeV with Monte Carlo Markov Chain (MCMC) analysis using Cobaya, a framework for sampling and statistical modeling. We compared our results with those for dark matter and proton interaction cross sections and found that dark matter masses of around 1MeV and lower have a tighter bound in electrons than protons. This is not true for higher mass ranges. Our results provide stronger constraints for dark matter particles by orders of magnitude.

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