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## Constraints on Dark Matter Annihilation by Synchrotron Emission based on Planck Data

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Synchrotron emission is a good probe for dark matter (DM) particles in the Universe. We search for DM annihilation signals in the Milky Way by using Planck data of synchrotron emission in the microwave bands. We investigate the production of dark matter annihilation into electrons and positrons by studying different channels. We look for upper limits of the mass of dark matter particles on the relevant cross-section obtained by Planck data at different wavelengths. According to our results, the dark matter annihilation cross-section into electron-positron pairs should not be higher than the canonical value for a thermal relic if the mass of the dark matter candidate is smaller than a few GeV. In addition, we also look for constraints on the inner slope of dark matter density profile in the Milky Way. Our results indicate that the inner slope of dark matter profile is between 1 to 1.5.

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