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Planck observations of the Galactic polarized synchrotron emission and constraints on Dark Matter

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The Planck collaboration has produced precise observations of the polarized synchrotron emission in the microwave band.
This emission is sensitive to the presence of a possible signal from Dark Matter annihilation or decay.
We use, for the first time, synchrotron polarization to constrain the DM annihilation cross section by comparing theoretical predictions with the latest polarization maps obtained by Planck. We find that synchrotron polarization is typically more constraining than synchrotron intensity by about one order of magnitude, independently of uncertainties in the modeling of electron and positron propagation, or of the Galactic magnetic field. Our bounds compete with Cosmic Microwave Background limits in the case of leptophilic DM.

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