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Robust limits on dark matter annihilation from the high latitude γ-ray sky

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The Milky Way halo is the densest source of dark matter on the sky. As a matter of facts, the dark matter signals are expected to be stronger with a J-factor of ~ 10^22 GeV2.cm−5 than those coming from objects such as dwarf galaxies (J ~ 10^17 −10^19 GeV2.cm−5) or galaxy groups, even in regions away from the Galactic center. We present the results of an indirect search for dark matter annihilation signals in the gamma-ray data of Fermi-LAT. Our analysis is performed using 536 weeks of Pass 8 data within the energy range of 0.1 GeV - 1 TeV in the smooth Milky Way halo for the region |b|>20° and r<50° and for several annihilation channels. These results are obtained with SkyFACT, a new method of gamma-ray fitting which combines template fitting and image reconstruction and accounts for model background uncertainties. We expect to provide the most robust constraints on the annihilation cross section of dark matter at 95% C.L.

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