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Constraint on the nature of annihilating dark matter with Low Surface Brightness Galaxies

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In the context of the high energy astrophysics, the nature of dark matter annihilation expected to emit gamma rays have been probed utilizing observed gamma-ray flux in a direction of a high matter-density region. Recently, some studies have been performed with nearby dwarf galaxies or the Galactic center and then the cross section for dark matter annihilation have been constrained.

In our study, we focus on Low Surface Brightness Galaxies (LSBGs) cataloged by the observation data of Hyper Suprime-Cam (HSC). LSBGs can be used as novel tracers of dark matter annihilation signals because of being more massive than dwarf spheroids and having less astronomical contaminations due to relatively quiescent states of those, which can perform robust research for dark matter annihilation signals.

We model the gamma-ray flux from LSBGs using the 8 HSC-LSBGs measured each redshift, and comparing with observed gamma-ray flux by Fermi Large Area Telescope, provide the upper limit of the cross section for dark matter annihilation.

Moreover, we prospect the future constraint with soon-to-be-detected LSBGs by future observation. In our poster presentation, we report our method and results, and also discuss the prospects for the future constraint.

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