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Indirect dark matter detection from non-spherical dark halo in the Galactic dwarf spheroidals

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We estimate the annihilation (J) factors of non-spherical dark halos in the Galactic dwarf spheroidal (dSph) galaxies.
This is motivated by the fact that most of such estimations have so far treated the dSphs and their dark halos as spherical systems for simplicity, even though the luminous parts of dSphs as well as the shapes of dark halos predicted by cold dark matter simulations are not actually spherical but flattened.
Therefore, we address non-spherical mass models for dSphs rather than spherical mass models to obtain more reliable and realistic limits on J-factor values.
Using generalized axisymmetric Jeans modeling, we apply these to most recent kinematic data for 17 ultra faint dwarfs as well as 7 classicals and evaluate their astrophysical factors for dark matter annihilation.
From our analysis, we have three main results.

1. Our axisymmetric mass models are so much better fit than spherical ones, thus our work should be the more reliable estimator for astrophysical factors than spherical works.
2. Among analyzed dSphs, Triangulum 2 ultra faint dwarf galaxy is the most promising target in spite of large uncertainties.
3. The estimations of astrophysical factor are affected by non-sphericity of luminous and dark components as well as other systematic uncertainties such as sample size, the prior range and edge of dark halo.

Summary

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