Constraining the halo size from possible density profiles of hydrogen gas of Milky Way Galaxy

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Abstract

Secondary cosmic rays (CRs) (e.g. boron, antiproton) play an important role to understand the propagation of CRs in the Milky Way Galaxy. Such secondary CRs are produced due to interaction of primary CRs with the gaseous components of interstellar medium (ISM). We consider mainly molecular, atomic, and ionized components of hydrogen gas for our study. Recent observations and hydrodynamical simulations provide new forms of density profiles of hydrogen gas in Milky Way Galaxy. In the *DRAGON* code, we have implemented our chosen density profiles, based on realistic observations in radio, X-ray and gamma-ray wavebands, and hydrodynamical simulations of interstellar hydrogen gas to study the variation in the height of the halo required to fit the observed CR spectra, keeping all other parameters unchanged. Our result shows the half-height of halo (L) varies in the range of 1 to 4 kpc for the density profiles considered in our work.

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