

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

Galactic magnetic field (GMF) and secondary cosmic rays (CRs) (e.g. ^{10}Be , boron, antiproton) are important components to understand the propagation of CRs in the Milky Way Galaxy. Realistic modeling of GMF is based on the Faraday rotation measurements of various Galactic and extragalactic radio sources and synchrotron emission from CR leptons in the radio frequency range, thereby providing information of halo height. On the other hand, diffusion coefficient and halo height are also estimated from the $^{10}\text{Be}/^9\text{Be}$ and B/C ratios. Moreover, density distribution of gaseous components of interstellar medium (ISM) also plays an important role as secondary CRs are produced due to interaction of primary CRs with the gaseous components of 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 γ -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. Our results show the halo height (z_t) varies in the range of 2 to 6 kpc for the density profiles considered in our work.

Session

Cosmic Rays

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