

Probing Galaxy structure with VHE gamma rays

As an observer from within the Milky Way, it is difficult to determine its global structure. Despite extensive observational data from surveys at different wavelengths, there is no coherent picture of the structure of our own Galaxy. On the contrary, depending on the observational method, the results can differ notably. One example is the position of the Sun, with recent results ranging from 0 pc to 25 pc in height above the plane. Such differences may be due to local features or different structure formation of the objects that can be considered as indicators of the structure of the Milky Way (e.g. ISM, OB stars, globular clusters) or to observational biases in the survey of these objects. At most wavelengths, absorption contributes significantly to the observational bias.

The observation of very-high-energy (VHE) gamma rays does not suffer from absorption on Galactic scales. At the same time, typical sources of VHE gamma rays (e.g. SNRs, PWNe, molecular clouds) are closely related to classical indicators of Milky Way structure. Therefore, a less biased view of our Galaxy can be obtained with surveys in this energy range. Although most of the sources seen in VHE lack distance information, their distribution on the sky provides valuable information about the Galactic structure, such as the conspicuous asymmetry in the latitudinal distribution, which can be related to the position of the Sun above the Galactic plane. In this contribution, we will discuss the results of recent Galactic surveys with H.E.S.S. and HAWC with respect to the structure of the Milky Way and assess how future surveys can help to provide a more accurate picture.

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Session Classification: Contributed posters