

Low-Energy Cosmic-Ray distribution in the Galactic Centre Region : A study of the Sagittarius B2 molecular cloud

The Centre of the Milky Way galaxy (GCR), approximately 8 kpc from the Earth, is a peculiar region due to its high density of stars, the resulting amount of stellar activity, and the existence of a Supermassive Black Hole among other reasons. The acceleration and transport of Cosmic rays (CR) in such a region is naturally a subject of high interest.

Gamma-ray observations and H3+ column density measurements are indirect ways of estimating the CR density in a faraway region. The latter, in particular, is related to the CR ionization rate, and hence to the distribution of Low-energy Cosmic rays (LECR). Most recent observations suggest that the ionization rate in the GCR is about 1000 times larger than the Spitzer value observed locally. Can we conclude that the LECR population is 1000 times larger as well? An estimation of the LECR population in the GCR can help answer this question.

A significant sample of this region that we focus on here, is the Sagittarius B2 molecular cloud (MC). It is the densest and most massive MC in the Galaxy and it is located approximately 120 pc from Sgr A*. We intend to constrain the LECR population in this MC using H3+ measurements, X-ray observations of Fe K Alpha line emissions, and Gamma rays from Synchrotron radiation and Non-thermal bremsstrahlung radiation.

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