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# Numerical Solutions for Cosmic Ray Tranpsport

Since their discovery in 1912, the origin of cosmic rays remains a mystery. The energy spectrum of cosmic rays suggests that these charged particles can be accelerated up to PeV energies within our Galaxy by so-called PeVatrons. As these charged particles propagate through the Galaxy, they are deflected by interstellar magnetic fields, as such we cannot trace them back. Instead, alternative messengers from cosmic-ray interactions (e.g., gamma rays and neutrinos) can be used to obtained information about these accelerators. Gamma-ray observatories such as LHAASO and H.E.S.S. provide the first glimpse of where to find PeVatrons within our Galaxy.

To understand and accurately model gamma-ray emissions, it is crucial to understand the transport of cosmic rays as they propagate within our Galaxy. Realistically modelling the transport of cosmic rays as they interact with magnetic fields, interstellar medium, photon fields and undergo losses lends itself to numerical solutions. This poster will give an overview of particle transport and solution methods and cover early development of a numerical model for cosmic ray diffusion and energy losses.

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