DIFFUSIVE PARTICLE TRANSPORT IN HELIOMAGNETIC FIELDS WITH ORGANIZED LATITUDINAL COMPONENTS

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We discuss the potential role the meridional component of the large-scale heliospheric magnetic field (HMF) may play in the transport of cosmic rays. The standard Archimedean spiral lines of the steady, large-scale HMF has no latitudinal component. Hence latitudinal transport of particles may occur only through particle drifts and cross-field diffusion. Most of the numerical works developed so far were built on and taking advantage of this presumption. Though the inclusion of an additional meridional field component is simple conceptually it still poses serious challenges to numerical models. The present work considers examples where organized latitudinal field is present. We address the Fisk field as the prime target of the present work. Also discussed are the meridional fields that inescapably emerge in connection with the reorganization of the global HMF as the tilt angle of the heliospheric current sheet (HCS) changes. Analytical approximations and numerical simulations will be presented. The presence of a small organized latitudinal field is important if cross-field diffusion ($\kappa_\perp$) is small. We present the results of a numerical code custom-designed for this specific purpose optimized for small $\kappa_\perp$.