



Contribution ID: 66

Type: Oral Presentation

Modelling galactic cosmic ray drifts in the presence of a Fisk-type heliospheric magnetic field

Thursday, 6 July 2023 14:20 (20 minutes)

Drift effects due to gradients and curvature in the heliospheric magnetic field (HMF) have long been known to affect cosmic ray (CR) modulation. Thus far, only drift effects due to the geometry of the HMF proposed by Parker (1958) have been studied. However, several other HMF models exist, including the model proposed by Fisk (1996), which, notably, has a latitudinal component. The Fisk-Parker hybrid HMF proposed by Burger & Hitge (2004) assumes that the HMF is Parkerian at the poles and in the ecliptic plane, and Fisk-like at mid-latitudes. In this presentation, the effects of the Fisk-Parker hybrid HMF on CR drifts are discussed; these results show, for the first time, that a Fisk-type HMF results in a CR drift velocity profile which differs significantly from what has first been described for the Parker HMF by Jokipii & Thomas (1981). Furthermore, different approaches to modelling drift due to the heliospheric current sheet are investigated; these include the models proposed by Burger (2012) and Engelbrecht et al. (2019).

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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Session Classification: Astrophysics & Space Science

Track Classification: Track D2 - Space Science