EFFECT OF FISK-TYPE HELIOSPHERIC MAGNETIC FIELDS ON THE LATITUDINAL TRANSPORT OF COSMIC RAYS

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A heliospheric magnetic field (HMF) with a meridional component, such as the model of Fisk, leads to a more complicated form of the transport equation (TPE) for cosmic rays than is the case for the Parker model. The number of mixed derivatives increases and as a result the numerical codes used to solve the TPE becomes unstable more easily. In this progress report we circumvent some of these complications by using restrictive transport parameters. Apart from the standard Fisk field, we also consider a second Fisk-type field. Here the motion of the footpoints of the magnetic field on the source surface are assumed to follow circles centred on an axis that is perpendicular to the rotational axis of the Sun. Such footpoint motions may occur, for instance, when the orientation of the solar magnetic dipole changes. We solve the three-dimensional steady-state TPE in a system corotating with the Sun, using spherical coordinates in an ADI numerical scheme. We show how both the standard Fisk field and the second Fisk-type field change the latitudinal cosmic-ray distribution.Given our choice transport parameters, we see small effects. These should however be indicative of what can be expected when the restrictions on the transport parameters are relaxed.