



Modelling the modulation of galactic cosmic ray transport in the heliosphere

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We study modulation of the galactic cosmic rays in the heliosphere using a 2D-axisymmetric model of the heliosphere. Galactic cosmic rays suffer from several modulation effects in the heliosphere: convection, adiabatic cooling by the solar wind, scattering on magnetic inhomogeneities, gradient and curvature drift in the heliospheric magnetic field and also the drift along the heliospheric current sheet. Our 2D-model uses a stochastic simulation technique which allows the different modulation processes to be studied separately. We show the streaming patterns obtained by tracing millions of cosmic ray particles in the heliosphere, first without any drift effects, then including the regular (gradient and curvature) drift effect and finally including also the current sheet drift effect. In the present version of the model the current sheet is flat. However, subsequent versions will have a more realistic, tilted current sheet. The results show that, even with a flat current sheet, cosmic ray modulation is strongly modified by the inclusion of the current sheet.