

Effects of the solar wind termination shock and heliosheath on the modulation of galactic and anomalous Helium

U.W. Langner^{a,b} and M.S. Potgieter^a

(a) Unit for Space Physics, North-West University, Potchefstroom 2520, South Africa

(b) Institut für Theoretische Physik IV, Ruhr-Universität Bochum, 44780 Bochum, Germany

Presenter: M.S. Potgieter (fskuwl@puk.ac.za), ger-langner-U-abs2-sh33-poster

The effect of the solar wind termination shock on charge-sign dependent modulation, experienced by galactic cosmic ray Helium (He^{++}) and anomalous Helium (He^+), is the main topic of this work. The modulation of galactic and anomalous Helium is studied with a numerical model including a more fundamental and comprehensive set of diffusion coefficients, a solar wind termination shock with diffusive shock acceleration, a heliosheath and particle drifts.

The model allows a comparison of modulation with and without a solar wind termination shock and is applicable to a number of cosmic ray species during both magnetic polarity cycles of the Sun. The modulation of Helium including an anomalous component is also done to establish charge-sign dependence at low energies. We found that the heliosheath is important for cosmic ray modulation and that its effect on modulation is very similar for protons and Helium.

The local Helium interstellar spectrum may not be known at energies $< \sim 1$ GeV until a spacecraft actually approaches the heliopause because of the strong modulation that occurs in the heliosheath, the effect of the solar wind termination shock and the presence of anomalous Helium. This 'barrier' effect in the heliosheath is however strongly dependent on energy.

This work, with full references, has been published:

U. W. Langner and M. S. Potgieter, *Annales Geophysicae*, Vol. 22.

