29th International Cosmic Ray Conference Pune (2005) **2**, 129-130

Modulation of cosmic ray boron and carbon in the heliosphere

M.S. Potgieter[a] and U.W. Langner[a,b]
(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 (fskmsp@puk.ac.za), saf-potgieter-MS-abs3-sh33-poster

The observed boron to carbon ratio (B/C) at Earth provides a good measure of the overall secondary to primary ratio of galactic cosmic rays, which makes it an important constraint and test for the validity of numerical models for galactic propagation and heliospheric modulation. Therefore, a numerical model of the heliosphere containing a termination shock, a heliosheath and particle drifts, is used to the study the modulation of the two species.

Despite the rather flat interstellar spectrum for carbon below 100 MeV/nuc, the modulated spectra at 1 AU look very similar for boron and carbon, caused by adiabatic energy losses, implying that the carbon modulation should have a much larger radial gradient in the outer heliosphere than boron.

Significant modulation can be caused by the heliosheath but it is strongly dependent on energy and the magnetic field polarity. The termination shock has an important effect on the B to C ratio in the heliosphere, although small at Earth.

Heliospheric modeling indicates that the galactic spectra for B and C need further refinement around ~ 1 GeV/nuc in order to fit observations at Earth and that this refinement probably has to take into account the proposed contribution of interstellar carbon.

This work, with full references, has been published:
M. S. Potgieter and U. W. Langner, Annales Geophysicae, Vol. 22.