

ON THE VARIABILITY OF SUPRATHERMAL He⁺ IONS AT 1 AU

B. Klecker (1), A.T. Bogdanov (2), M. Hilchenbach (3), A.T. Galvin (4), E. Möbius (4), F.M. Ipavich (5), P. Bochsler (6)

(1) Max-Planck-Institut für extraterrestrische Physik, D-85740 Garching, Germany, (2) Institut für Geophysik und Meteorologie, Technical University Braunschweig, Braunschweig, Germany, (3) Max-Planck-Institut für Aeronomie, D-37819 Katlenburg-Lindau, Germany, (4) University of New Hampshire, Durham, NH, USA, (5) University of Maryland, College Park, Md, USA, (6) University of Bern, CH-3012 Bern, Switzerland.

bek@mpe.mpg.de/Fax +49-89-30000-3569

Using data from the STOF experiment onboard SOHO we investigate the variation of suprathermal He⁺/He²⁺ abundances in the energy range 85-280 keV during the years 1997 to 1999. We observe a large variability of the He⁺ abundances ranging from He⁺/He²⁺ < 5% to ~ 1. The very large abundances are closely related with the passage of interplanetary shocks, whereas abundances of ~ 0.15 have been observed at 1AU during CIR events. Combining the data from STICS/WIND and STOF/SOHO we are able to extend the energy range for one of the events with He⁺/He²⁺ ~ 1 to 2 keV/nuc. The energy spectrum at low energies shows a cutoff energy at twice the solar wind velocity, with a suprathermal tail extending to a few 100 keV, typical for a pickup ion source. We correlate daily averages of the He⁺ abundances of the suprathermal tail for all days with significant He⁺ flux with solar wind parameters and find a general anticorrelation of He⁺ abundances with solar wind velocity and solar wind thermal velocity. We discuss possible causes of this variability, e.g. variations of the source strength of pickup ions and solar wind alphas and variations of the injection and acceleration efficiency of He⁺ and He²⁺ with solar wind parameters.