15TH ANNUAL INTERNATIONAL ASTROPHYSICS CONFERENCE
POSTER ABSTRACTS

Krasnoselskikh, Vladimir	***Probabilistic Model of Beam - Plasma Interaction in Randomly Inhomogeneous Solar Wind*** Krasnoselskikh Vladimir, LPC2E/CNRS-University of Orleans, France Voshchepynets Andrii, LPC2E/CNRS-University of Orleans, France In this presentation we describe the effects of plasma density fluctuations in the solar wind on the relaxation of the electron beams ejected from the Sun. The density fluctuations are supposed to be responsible for the changes in the local phase velocity of the Langmuir waves generated by the beam instability. Changes in the wave phase velocity during the wave propagation can be described in terms of probability distribution function determined by distribution of the density fluctuations. Using these probability distributions we describe resonant wave particle interactions by a system of equations, similar to well known quasi-linear approximation, where the conventional velocity diffusion coefficient and the wave growth rate are replaced by the averaged in the velocity space. It was shown that the process of relaxation of electron beam is accompanied by transformation of significant part of the beam kinetic energy to energy of the accelerated particles via generation and absorption of the Langmuir waves. We discovered that for the very rapid beams with beam velocity V_b > 15 v_T, where v_T is a thermal velocity of background plasma, the relaxation process consists of two well separated steps. On first step the major relaxation process occurs and the wave growth rate almost everywhere in the velocity space becomes close to zero or negative. At the seconde stage the system remains in the state close to state of marginal stability enough long to explain how the beam may be preserved traveling distances over 1 AU while still being able to generate the Langmuir waves.
Potgieter, Marius	***Newly computed local interstellar spectra for galactic protons, electrons, Helium and Carbon modelled on Voyager 1 and PAMELA observations*** Driaan Bisschoff, Centre for Space Research, North-West University, South Africa. Marius Potgieter, Centre for Space Research, North-West University, South Africa. The comparison of computed galactic spectra with experimental, in situ data at lower energies is finally possible with the cosmic ray observations made by the Voyager 1 spacecraft outside the dominant modulating influence of the heliosphere. Galactic spectra computed by galactic propagation models and considered to be local interstellar spectra (LIS), for specifically protons, electron, Helium and Carbon nuclei, can now be compared with observations at low kinetic energies (less than 100 MeV/nuc) from Voyager 1 and at high energies (above 30 GeV/nuc) from the PAMELA space detector at the Earth. We set out to reproduce the Voyager 1 observations beyond the heliopause using the GALPROP code and the PAMELA spectra at the Earth via a comprehensive solar modulation model. By varying the galactic diffusion parameters in the GALPROP plain diffusion model, specifically the rigidity dependence of spatial diffusion, and then including reacceleration in Galactic space, we compute spectra simultaneously for galactic electrons, protons, Helium and Carbon. These LIS are then used as input to a full 3D solar modulation model to test the modulated spectra against PAMELA observations. We present new LIS with expressions for the energy range of 3 MeV/nuc to 100 GeV/nuc, which should be most valuable for further solar modulation modelling.
Verkhoglyadova, Olga	***Effects of Two SEP Events and Geomagnetic Storms on Nighttime Mesospheric Hydroxyl Enhancements: Modeling and Observations*** O.P. Verkhoglyadova, Jet Propulsion Laboratory, California Institute of Technology, USA J.M. Wissing, Institute of Environmental Systems Research, University of Osnabrück, Germany S. Wang, Jet Propulsion Laboratory, California Institute of Technology, USA M.-B. Kallenrode, Institute of Environmental Systems Research, University of Osnabrück, Germany G.P. Zank, Department of Space Science, University of Alabama in Huntsville, USA We discuss physical causes for nighttime hydroxyl (OH) density enhancements during two solar energetic particle (SEP) events accompanied by strong geomagnetic storms. Precipitating solar protons and magnetospheric electrons cause ionization of the middle atmosphere, increase hydroxyl density and ultimately affect mesospheric ozone. We show modeling results for ionization rates for 7-17 November 2004 and 20-30 August 2005 intervals from the Atmospheric Ionization Module Osnabrück (AIMOS) with enhanced ion chemistry module. Geostationary Operational Environmental Satellites (GOES) and Polar Orbiting Environmental Satellites (POES) particle measurements are processed and used as the model input. We demonstrate that increased atmospheric ionization rates from 0.001 hPa to 0.1 hPa pressure levels during these events and estimates of hydroxyl production are consistent with enhanced nighttime averaged zonal hydroxyl densities observed by Microwave Limb Sounder (MLS) instrument onboard Aura. We show that both precipitating SEPs and magnetospheric electrons during accompanying geomagnetic storms contribute to mesospheric ionization and result in hydroxyl enhancement.