



Where are CIR-associated suprathermal particles accelerated?

Olga Khabarova (1), Olga E. Malandraki (2), and Gang Li (3)

(1) Heliophysical Laboratory, Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation RAS (IZMIRAN), Troitsk, Moscow 142190, Russia, (2) IAASARS, National Observatory of Athens, GR-15236 Penteli, Greece, (3) Center for Space Plasma and Aeronomic Research (CSPAR), University of Alabama in Huntsville, Huntsville, AL 35805, USA

Corotating interaction regions (CIRs) are believed to be the main source of suprathermal particles at the Earth's orbit in absence of flares and CMEs. The dominant paradigm says that in this particular case, particles are accelerated rather far from the Earth, at 2-3 AU, where reverse shocks are formed. According to this scenario, the particles should propagate back to the Earth's orbit, which demands specific time-intensity profiles of observed particle fluxes.

We discuss here unusual cases, when it is hardly possible to explain observations through such an approach, and suggest an alternative hypothesis on local particle acceleration determined by (a) plasma confinement, (b) the presence of small-scale magnetic islands, (c) the occurrence of the heliospheric current sheet of smaller-scale current sheets in the solar wind, preceding the CIR approach.

The theoretical basis for this is given in (Zank et al., ApJ, 2014) and applications of the idea to the HCS case are discussed in (Khabarova et al. ApJ, submitted).

Khabarova O., Zank G.P., Li G., le Roux J.A., Webb G.M., Dosch A., and Malandraki O.E., Small-scale magnetic islands in the solar wind and their role in particle acceleration. Part 1: Dynamics of magnetic islands near the heliospheric current sheet. Submitted to ApJ, 2014

Zank G.P., le Roux J.A., Webb G.M., Dosch A., and O. Khabarova. Particle acceleration via reconnection processes in the supersonic solar wind. The Astrophysical Journal, 797, 1, 28 (18pp), 2014