



On the role of local CIR-associated particle acceleration in formation of time-intensity profiles of suprathermal particle fluxes

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A possibility of local acceleration of particles up to several MeV at the edge of corotating interaction regions (CIRs) in the solar wind is discussed. Recently, evidence for significant local particle energization due to magnetic reconnection that occurs at the heliospheric current sheet (HCS) and followed by consequent trapping and re-acceleration of suprathermal particles in magnetic islands surrounding the rippled HCS was provided (Khabarova et al. 2014). We investigate this phenomenon in application to particle energization at current sheets of various scales (from the HCS to local small-scale current sheets), including current sheets frequently observed at the edge of CIRs, and explore the role of magnetic islands in the picture of suprathermal particle flux enhancements associated with CIRs. It is commonly believed that CIRs serve as one of the sources of suprathermal particles at the Earth's orbit in addition to flares and pre-CME shocks because of particle acceleration by reverse shocks formed beyond 2-3AU. However, this paradigm demands a free way of particles back from the shocks to 1 AU, which produces specific timing and ion/electron flux features that are not observed every time. We suggest that local particle acceleration may take place directly at the CIR edge in the case of the HCS-CIR interaction, as well as be determined by the occurrence of electric field in merging/contracting magnetic islands and local reconnecting current sheets (Zank et al. 2014) in the turbulent plasma of CIRs. Multi-spacecraft data analysis (STEREO, Wind, ACE and Ulysses) is performed.

Khabarova O., Zank G.P., Li G., le Roux J.A., Webb G.M., Dosch A., Zharkova V.V. 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