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Particle acceleration in shock-shock interaction – multi-spacecraft in situ observations

Heli Hietala (1), Neus Agueda (2,3), Katerina Andréeová (1), Rami Vainio (1), Stuart Nylund (4), Emilia K. J. Kilpua (1), Hannu E. J. Koskinen (1,5)

(1) Department of Physics, University of Helsinki, Helsinki, Finland (heli.hietala@helsinki.fi), (2) Space Science Laboratory, University of California, Berkeley, California, USA, (3) Departament d'Astronomia i Meteorologia, Universitat de Barcelona, Barcelona, Spain, (4) Applied Physics Laboratory, Johns Hopkins University, Laurel, Maryland, USA, (5) Finnish Meteorological Institute, Helsinki, Finland

We use detailed multi-spacecraft observations to study the interaction of an interplanetary (IP) shock with the bow shock of the Earth on August 9-10, 1998. We can distinguish four different phases of particle acceleration in the shock-shock interaction:

(1) establishing magnetic contact with IP shock and the seed population of energetic particles accelerated by it,

(2) reacceleration of this population by the bow shock,

(3) first order Fermi acceleration as the two shocks approach each other, and

(4) particles accelerated and released as the shocks collide.

Such a detailed analysis was made possible by the particularly advantageous quasi-radial interplanetary magnetic field configuration. To our knowledge this is the first time the last phase of acceleration at a shock-shock collision has been reported using *in situ* space plasma observations.