



Can high-energy proton events in solar wind be predicted via classification of precursory structures?

Sarah Hallerberg (1), Alexander Ruzmaikin (2), and Joan Feynman (2)

(1) TU Chemnitz, Institute of Physics, Complex Systems and Nonlinear Dynamics, Chemnitz, Germany
(sarah@mpipks-dresden.mpg.de), (2) Jet Propulsion Laboratory, California Institute of Technology

Shock waves in the solar wind associated with solar coronal mass ejections produce fluxes of high-energy protons and ions with energies larger than 10 MeV. These fluxes present a danger to humans and electronic equipment in space, and also endanger passengers of over-pole air flights. The approaches that have been exploited for the prediction of high-energy particle events so far consist in training artificial neural networks on catalogues of events. Our approach towards this task is based on the identification of precursory structures in the fluxes of particles. In contrast to artificial neural networks that function as a "black box" transforming data into predictions, this classification approach can additionally provide information on relevant precursory events and thus might help to improve the understanding of underlying mechanisms of particle acceleration.