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Advanced Data Analysis of Nonlinear and Complex Processes in Space Physics

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Enhanced resolution and sensitivity, in time, space and frequency, have given excellent observations enabling the identification of complex dynamical regimes in plasmas of the solar system. The appearance of such spatio-temporal and spectral nonlinear variability and instabilities are due to complex regimes as fully developed and localized turbulence, stochastic ressonance, self/forced organized criticality, spatio-temporal intermittency and chaotic attractors. Examples of solar data revealing these phenomena are the time series, dynamical spectra and images obtained by many antenas and telescopes onboard Yohkoh, SOHO, HESSI and TRACE satellites. In this talk we describe why the gradient pattern analysis and global wavelet spectra are accessible for the analysis of nonlinear signals in the context of space physics.

Keywords: **global wavelet spectra**, **nonlinear processes**, **turbulence**, **stochastic ressonance**, **self/forced organized criticality**, **spatio-temporal intermittency**, **chaotic attractors**

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