rádio é feita para o período de grande atividade solar de outubro e novembro de 2003, quando houve o registro de mais de 50 eventos intensos em raios-X, sendo que 11 alcançaram fluxos superiores a 10-04 W/m2 e 1 saturou os receptores do Geostationary Operational Enviromental Satellites (GOES). Foi aplicada a técnica Wavelet de Multi-Resolução para calcular as componentes de período do sinal, e os índices espectrais para analisar a importância relativa entre os períodos mais longos e os mais curtos. Os resultados sugerem variação no comportamento das componentes de período do sinal, bem como nos índices espectrais, minutos antes das explosões com fluxos inferiores a 200sfu, horas ou até dias antes das explosões com fluxos superiores 200 sfu. Foi feita a comparação entre as variações dos índices, da polarização rádio e a evolução da configuração magnética das regiões onde ocorreram as grandes explosões. Os dados da configuração magnética das regiões ativas são obtidos do experimento MDI. Este trabalho apresenta com detalhes os resultados e discute a previsão dos eventos solares, através do comportamento do sinal em microondas e das variações dos campos magnéticos.

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TEMPORAL PATTERN VARIABILITY AND GRADIENT SPECTRA OF SOLAR RADIO PULSATIONS RECORDED AT 1710 MHZ

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Stochastic intermittent fluctuations are characterized by time series that display multi-scaling, irregular and quasi-regular amplitudes. Usually, intermittency is a characteristic of the underlying dynamics and it is difficult to quantify, as it appears in many variability patterns. Here, we report the results of the analysis of the temporal pattern variability of solar radio pulsations recorded at 1710 MHz, associated with an event observed with high temporal resolution by the Brazilian Solar Spectroscope (BSS) on November 24, 2000 (15:09:38-15:11:51 UT). These radio pulsations are associated with the X2.3 soft X-ray flare recorded by GOES satellite between 14:51 UT and 15:21 UT, and peaked at 15:13 UT. During this event, many observatories reported radio emission observed between 245 and 15400 MHz. A set of intermittent time series, recorded along to the radio pulsation, with time resolution of 54.6 ms and frequency resolution of 10 MHz, were analyzed applying a new methodology based on the gradient pattern analysis conjugated to the discrete Daubechies wavelet decomposition. The results of this analysis point out that this method can reliably characterize intermittency scaling process of short time series ($N < 10^3$ measurements) as the

radio bursts addressed here. By the estimation of the mutual distance information (defined as the distance D = p1 log (p1/p2) between two probability distribution functions p1 and p2, where p2 is a canonical probability distribution function, e.g. obtained from a Gaussian fluctuation) in the gradient spectra, we show that the fluctuation pattern of these solar bursts is due to complex stochastic processes probably related to the primary energy release coming from a set of stochastic acceleration regions related to a system of many interacting coronal loops. These results and their implications for energy release process in solar flares will be presented and discussed.

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CHARACTERIZING THE NEUPERT EFFECT

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The Neupert effect is the empirical observation that the time profile of the hard X-rays (HXR) resembles that of the time derivative of the soft X-rays (SXR) profiles, bringing a link between the non-thermal and thermal emission. Therefore the quantitative analysis of the Neupert effect may give clues about phenomena like Chromospheric Evaporation, Coronal heating and the energetics of flare events. Recent efforts to quantify the effect are based on: a) the determination of the delays between the maximum of the SXR and the end of the HXR radiation and b) the comparison between the fluence of the HXR and the instant peak flux of the SXR. These are "integral" characteristics. A different approach is to analyze the "instantaneous" characteristics which provide more information and gives more robust results because they can be analyzed along the entire duration of the event. We propose the use of the cross correlation of the SXR time derivative and HXR time profile wavelet transforms. Wavelets are mathematical tools that separate the different time scales underlying in a time signal. With this methodology we obtain, among others: i) the delay between the SXR time derivative and HXR time profile along the whole event, ii) the HXR energy band and the time scale which are better represented by the Neupert Effect. In this work we present details of the "instantaneous" methodology and some preliminary results using SXR observations of GOES satellites and HXR from RHESSI. A comparison with the "integral" methodology is also presented.