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## Spike-like structures near the front of type-II bursts from ARTEMIS-JLS and NRH observations

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Narrow-band bursts (spikes) are very small duration and bandwidth bursts which appear on dynamic spectra from microwave to decametric frequencies; they are believed to be manifestations of small scale energy release through magnetic reconnection. Here we present the results of a study of the characteristics of spike-like structures detected near the front of type-II bursts. We used high sensitivity, low noise dynamic spectra obtained with the acousto-optic analyzer (SAO) of the ARTEMIS-JLS solar radio spectrograph, in conjunction with high time resolution images from the Nançay Radioheliograph (NRH) of a type-II radio burst recorded during the November 3, 2003 extreme solar event. The NRH data provided positional information which were combined with the ARTEMIS-JLS/SAO dynamic spectra. We identified several spikes in the NRH images and measured their size and position. Chains of spike-like structures appear to have a significant contribution to the emission of the type-II burst front. This study indicates that the formation of spike-like chains almost parallel to the type II front are signatures of small-scale reconnection along the shock front. The preponderance of these chains, together with the lack of isolated structures or irregular clusters, points towards some, as yet indeterminate, process inducing some form of order to the reconnection events along the type-II propagating front.

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