

Proposal of Scientific Project for validating Benke

solar burst classification for space weather forecast

1. What is space weather?

The term space weather comprises effects on the Earth's space environment that affect technology and human beings that are not protected by the atmosphere or the magnetic field of the Earth. Prediction of the impact of solar disturbances is of great potential importance if alerts could be emitted with a sufficient advance warning time and a low false alarm rate. As of today it is not possible to predict that an eruptive solar event will occur within a given time lapse in the future. But one can aim at using the first observable signatures of an eruptive event to predict the arrival near the Earth of high energy particles (SEP,CME). The first signature of an eruptive event is electromagnetic radiation. This could provide advance warning times of about an hour for SEPs, and of a day or more for CMEs.

2. The work :

Robust algorithms for the automated recognition of particular features (namely type III, type II and type IV bursts) on time-frequency power distributions will be developed. These tools will on the one hand serve astrophysical and space weather research purposes, by enabling a more objective analysis of radio spectra than the human eye, and by giving the possibility to extract observations of specific spectral types from large data sets. Furthermore, we intend to develop these algorithms in a way that they will be ready for implementation and tests in operational services.

3. The team :

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K. Abed-Meraim, L.T. Nguyen, V. Sucic, F. Tupin, and B. Boashash, ”An Image Processing Approach for Underdetermined Blind Separation of Nonstationary Sources”, in Proc. of Int. Symp. On Sig. and Image Proc. and Analysis, Rome, Sep. 2003.

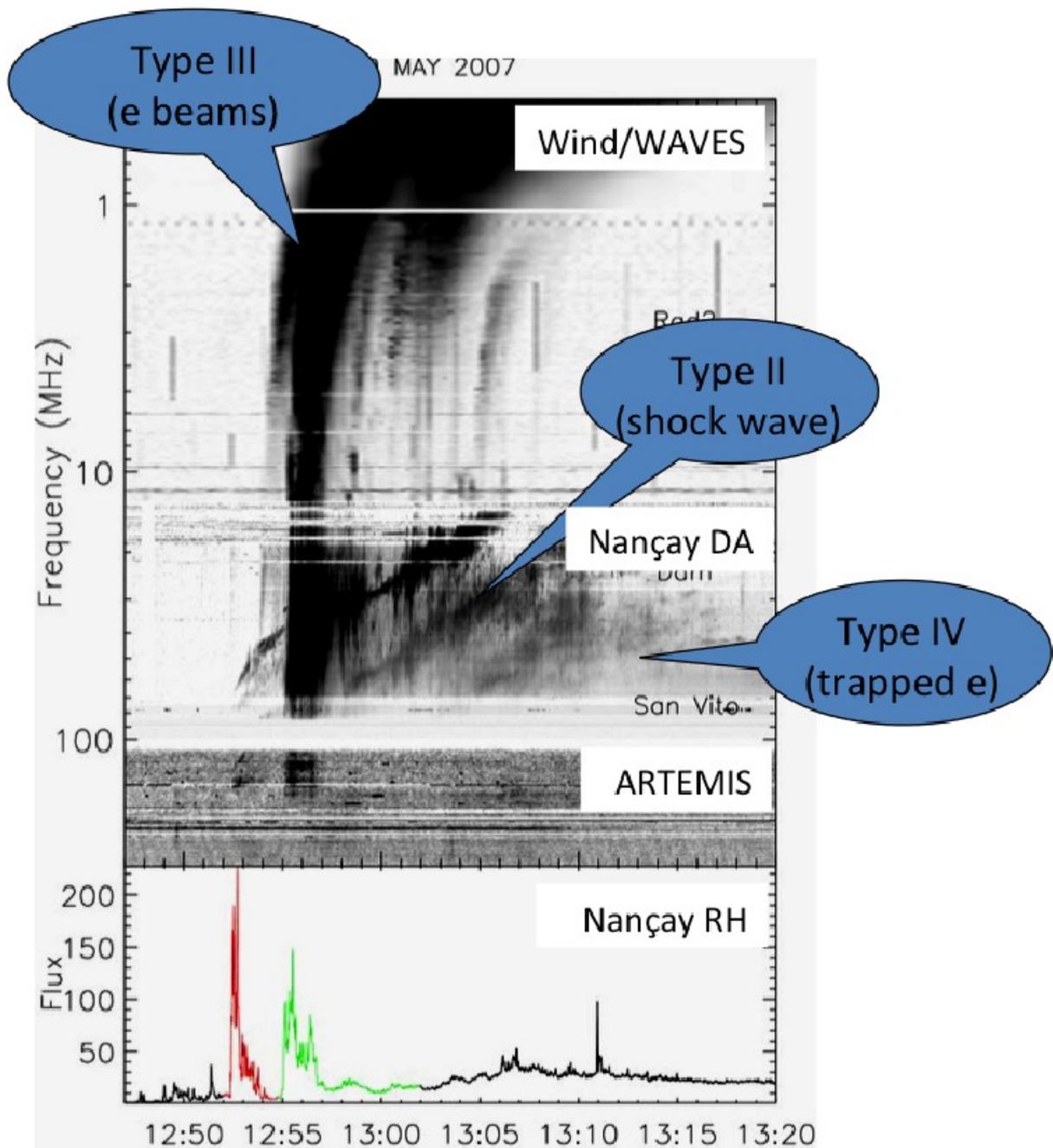


figure 1: illustration of a dynamic spectrum of a solar radio burst (adapted from Kerdraon et al. 2010). The lower frame shows the evolution of the flux density at one frequency. The upper panels show the evolution in the frequency-time plane. Bright emission is shown by dark shading.