Geophysical Research Abstracts
Vol. 15, EGU2013-1683, 2013
EGU General Assembly 2013

Microwave coherent emissions from solar flares - a look at through a large interferometer

Alexandre Altyntsev (1), Lesovoi Sergei (1), Meshalkina Natalia (1), Zhdanov Dmitrii (1), and Korolkova Natalia (2)

(1) ISTP SD RAN, Radioastrophysics, Irkutsk, Russian Federation (altyntsev@iszf.irk.ru), (2) IGU, Irkutsk, Russian Federation

The report discusses the results of microwave observations of coherent emission sources with broadband spectropolarimeters and the Siberian Solar Radio Telescope (receiving frequency about 5.7 GHz). To date, more than 300 events with narrowband subsecond pulses were recorded. It is revealed that at the small real sizes of sources their apparent sizes can reach the SSRT beam width ($\geq$ 15 arcsec) due to electromagnetic wave scattering by density fluctuations in the lower corona, or due to emission reflection from the underlying layers of the solar atmosphere. The fine emission sources usually occur near tops of the flare loops. In some events it was possible to reveal plasma parameters in the vicinity of the fine emission exciters from the X-ray, optical and continuum microwave images, and to identify the mechanisms of the coherent emission. The SSRT is an interferometer that allows to record spatial brightness distributions of a flare region at two close frequencies simultaneously. Such observations have showed that the frequency dynamics of fast drifting narrowband bursts (type III - like) is controlled not only by the velocity of exciter movement through gradients of the plasma parameters, but also by rapid changes in plasma parameters over time. We discuss the diagnostic potential of the observations of coherent emission sources and new possibilities of the instruments which are under construction now.
The work is supported by the Ministry of education and science of the Russian Federation (State Contracts 16.518.11.7065 and 02.740.11.0576), and by the grants RFBR (12-02-91161-GFEN-a,
12-02-00616 and 12-02-00173-a