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Study of the spectral fine structures of type IV solar radio bursts in the UHF band

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Abstract. Solar type IV burst is a broad-band continuum radiation and observed from meter into decimeter ranges (e,g, Boischot 1957). This type of burst has been known that it accompanies spectral fine structures such as fiber bursts and zebra pattern. The continuum component of the type IV has been associated with synchrotron emission of electrons trapped into magnetic field, while the fine structures are interpreted that they are radiated with coherent plasma emission mechanisms. Although the interaction of electrostatic plasma waves with whistler waves, proposed by Kuijpers (1975), is widely accepted as the generation mechanism of fiber bursts, but some alternative models have been also proposed and there remains unsolved problems in the generation mechanism. The resolution of previous radio spectral observations in the meter range is not sufficient to resolve these fine structures, while the detailed spectral features of the fine structures of solar radio bursts is important in understanding the processes in the solar corona and the radiation mechanism. In order to resolve the fine structures, we developed a new instrumentation having high spectral resolutions at Zao observatory of Planetary Plasma and Atmospheric Research Center, Tohoku University. The observation has been operated since the middle of June in 2008, and a group of solar type IV bursts has been detected during a period from November 2 to 3, 2008. In this event, some spectral fine structures similar to fiber bursts are found. The distribution of the drift rate of the bursts has a peak value around $50 \sim 75$ MHz/sec, while previous studies suggested 9.1MHz/sec for the typical drift rate of fiber bursts (e,g, Benz et al. 1998). In this presentation, we discuss these results of the analysis and the comparison with the previous observational studies.
Additionally, we have a new observation plan for solar radio emissions using a wave form receiver in the meter wave range. The wave form receivers enables us an observation with higher resolution than the spectral observation. We can also obtain the information of the phase of radio waves. In this presentation we

discuss the feasibility and the significance of the wave form observation in the study of the solar radio burst.