

## Spectral fine structure of solar radio bursts observed with IPRT/AMATERAS: Characteristics of zebra pattern

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It is known that there are a variety of complex fine structures in solar radio bursts in the meter to decimeter wave bands such as broadband pulsations, narrowband spikes, fiber bursts and zebra patterns. Since they are thought to be caused by some inhomogeneities or modulations of wave generation and/or radio propagation processes, they are significant sources of information about coronal plasma parameters and dynamical plasma processes occurring in the solar corona. Among the various fine structures, so called zebra pattern (ZP) has a particularly characteristic spectral pattern with parallel drifting narrow stripes in emission and absorption. Although several models for generating ZP have been proposed so far, the generation mechanisms have not been revealed well yet. It is considered that a superfine structure of zebra pattern has an important clue for the clarification. The superfine structures have been observed in microwave range with the time resolution of 8 ms (see Chernov et al. 2003), while in the metric wave range they have not been observed because of lack of the observations with high time resolution. In this study, we have tried to find out superfine structure of metric ZP for examining proposed generation mechanisms.

AMATERAS (the Assembly of Metric-band Aperture Telescope and Real-time Analysis System; Iwai et al., 2012) is a radio spectro-polarimeter for solar radio observation developed by Tohoku University. The specifications of this system are time resolution of 10 ms, frequency resolution of 61 kHz and the minimum detectable flux of 0.7 s.f.u. in the frequency range of 150 MHz to 500 MHz, which are enough to observe fine structures of solar radio bursts and analyze their spectral characteristics. In this study we focus on an event on June 21, 2011 associated with C7.7 class flare. In this event enhanced zebra patterns appeared with about 30 stripes in fast drifting envelopes like type III bursts or broadband pulsations in the frequency range of 155 MHz to 210 MHz with the duration of  $\sim 1$  min. Such spectral characteristics of this event are similar to the event reported by Chernov et al. (2005), which appeared on October 25, 1994 associated with C4.7 class flare around 150 MHz. In this presentation, we will show the spectral characteristics of this event precisely by comparing with the past events and discuss expected generation processes.