

Temporal Variation of Zebra Stripes in Type IV Solar Radio Bursts

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It is known that type IV solar radio bursts, which are emitted in association with flares, show various spectral fine structures. Zebra Patterns (ZPs) are one kind of such fine structures showing a number of nearly parallel drifting narrowband stripes, superimposed on the background broadband type IV bursts. Although many theoretical models for explaining the generation of the ZP are proposed, there is no widely accepted model which is consistent with all of observational characteristics. Tan et al. (2014) performed a statistical analysis on microwave ZPs and showed that microwave ZPs can be classified into three types according to the variation of frequency separation (Δf) with respect to its frequency. They also suggested that three types of ZPs are generated by three different mechanisms. As described above, the variation of Δf is important information to discuss generation mechanisms of ZPs. However, its temporal variation has not been studied before. For the purpose of revealing the temporal variation of Δf , we analyzed highly resolved spectral data obtained with AMATERAS, a solar radio telescope developed by Tohoku University. As a result, we found different types of the variation of Δf (equidistant ZP, varying distant ZP, and growing distant ZP) as mentioned in Tan et al. (2014). However the variation of Δf was not same throughout the ZP lifetime and it changed from one type to another during one continuous ZP. In this presentation, we will show the temporal variation of Δf in detail and discuss possible reasons for the variation.

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