



Contribution ID: 89

Type: **Invited talk in the parallel session**

## **Fast radio bursts and their high-energy counterpart from magnetar magnetospheres**

*Thursday, 8 July 2021 16:50 (20 minutes)*

The recent discovery of a Galactic fast radio burst (FRB) occurring simultaneously with an X-ray burst (XRB) from the Galactic magnetar SGR J1935+2154 implies that at least some FRBs arise from magnetar activities. We propose that FRBs are triggered by crust fracturing of magnetars, with the burst event rate depending on the magnetic field strength in the crust. Crust fracturing produces Alfvén waves, forming a charge starved region in the magnetosphere and leading to non-stationary pair plasma discharges. An FRB is produced by coherent plasma emission due to nonuniform pair production across magnetic field lines. Meanwhile, the FRB-associated XRB is produced by the rapid relaxation of the external magnetic field lines. In this picture, the sharp-peak hard X-ray component in association with FRB 200428 is from a region between adjacent trapped fireballs, and its spectrum with a high cutoff energy is attributed to resonant Compton scattering. The persistent X-ray emission is from a hot spot heated by the magnetospheric activities, and its temperature evolution is dominated by magnetar surface cooling. Within this picture, magnetars with stronger fields tend to produce brighter and more frequent repeated bursts.

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**Session Classification:** What Can We Learn from a Growing Sample of Fast Radio Bursts?

**Track Classification:** Fast Transients: What can we learn from a growing sample of Fast Radio Bursts?