



Contribution ID: 1096

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

Magnetar Giant Flares as a progenitor of Short Gamma-Ray Bursts

Tuesday, July 6, 2021 6:50 AM (20 minutes)

Cosmological Gamma-Ray Bursts (GRBs) are known to arise from distinct progenitor channels: short GRBs mostly from neutron star mergers and long GRBs from a rare type of core-collapse supernova (CCSN) called collapsars. Highly magnetized neutron stars called magnetars also generate energetic, short-duration gamma-ray transients called Magnetar Giant Flares (MGFs). Three have been observed from the Milky Way and its satellite galaxies and they have long been suspected to contribute a third class of extragalactic GRBs. We report the unambiguous identification of a distinct population of 4 local (<5 Mpc) short GRBs, adding GRB 070222 to previously discussed events. Their properties, the host galaxies, and non-detection in gravitational waves all point to an extragalactic MGF origin. The inferred volumetric rates place these events as the dominant gamma-ray transient detected from extragalactic sources. We will discuss these results and some base implications on properties and formation of magnetars.

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Session Classification: Unusual and New Types of Gamma-Ray Bursts

Track Classification: Fast Transients: Unusual and New Types of Gamma-ray Bursts