Contribution ID: **47** Type: **not specified**

The extraordinary 2011 outburst of the magnetar Swift J1822.3-1606 Magnetar Model for GRBs

Monday, 25 April 2016 16:00 (20 minutes)

Magnetars are highly magnetized neutron star and energetic X-ray/ soft gamma ray bursts are often observed from these sources. The most energetic of these bursts,- the giant flares have been observed only from a few sources and exhibit distinct observational characteristics. The 2011 outburst of the relatively low magnetic field magnetar was quite extraordinary because of the unusual timing features present. Periodic modulations at the spin period of the underlying neutron star were clearly visible, remarkably similar to what is observed during the decaying tail of magnetar giant flares. We investigated the temporal characteristics of X-ray emission during the early phases of this outburst. It was observed that the hardness ratio (HR) is strongly anti-correlated X-ray pulse profile intensity much alike that is observed in the case of giant flares. The evolution of the pulse profile morphology also showed a similar behaviour like that for the giant flares but on much longer time scales. The energy emitted during the entire outburst is comparable to energy released in minutes during the decaying tail of the giant flares. Based on their similarities, we suggest that the triggering mechanisms of the giant flares and the outburst are likely the same. We propose that the trapped fireball that develops in the magnetosphere at the onset of the outburst radiates away efficiently in minutes in magnetars exhibiting giant flares, while in other magnetars, such as Swift J1822.3–1606, the efficiency of radiation of the fireball is not as high and, therefore, lasts much longer displaying outbursts. We discuss such a scenario in the light of the existing theoretical magnetar models.

Presenter: CHAKRABORTY, Manoneeta (Tata Institute of Fundamental Research)

Session Classification: Evening session