Contribution ID: **1** Type: **Oral Talk**

On the X-ray emission mechanisims of short bursts from magnetars

Wednesday, 24 April 2013 12:00 (20 minutes)

Magnetars are isolated neutron stars with extremely strong magnetic fields, commonly known as Soft Gamma Repeaters (SGRs) and Anomalous X-ray Pulsars (AXPs). Magnetars are persistent X-ray emitters. Occasionally they enter into active episodes, and emit X-ray bursts with luminosities anywhere between 10^{37} and 10^{45} erg/s. Persistent X-ray emission and bursts are both attributed to the decay of extremely strong magnetic fields in the framework of the magnetar model. However, it is not trivial to describe the observed data with detailed physical models, considering that the radiation ought to emerge from the strong magnetic and gravitational fields. In this talk I will first summarize our broadband spectral investigations of short duration bursts using phenomenological models, and then focus on our first attempt to study the burst spectrum with the physically motivated model. We detailed analyzed the spectra of both persistent emission and low-fluence bursts from SGR J0501+4516 observed during a very deep XMM-Newton observation near the peak of its 2008 outburst. For the persistent emission, we adopted an idealized physical model namely the Surface Thermal Emission and Magnetospheric Scattering model and spectroscopically determine important source properties such as the surface magnetic field strength and the magnetospheric scattering optical depth. We generated a magnetospheric scattered modified blackbody model and successfully described the low-fluence burst spectrum. Our results indicated that the burst and the persistent emission photons went through different radiation transfer processes before scattered in the magnetosphere. Therefore, very low-fluence bursts from magnetar are physically different from the persistent emission.

0

Please refer to the main papers:
Lin et al. 2012, ApJ, 759, 54
Lin et al. 2012, ApJ, 761, 132

Primary author: Dr LIN, Lin (Sabanci University)

Presenter: Dr LIN, Lin (Sabanci University)