First superburst observed by INTEGRAL/JEM-X

Chenevez, Jérôme

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

First superburst observed by INTEGRAL/JEM-X

Abstract:
By Jerome Chenevez
and
Søren Brandt
DTU Space - National Space Institute, Technical University of Denmark
Presentation type: talk

Contact: jerome@space.dtu.dk

X-ray bursters are neutron stars in low mass X-ray binaries where hydrogen and/or helium accretes on the surface, and explodes in recurrent thermonuclear runaways. Such type I X-ray bursts, characterized by a black-body emission, generally display a fast rise time followed by an exponential cooling decay of a few seconds to a couple of minutes. However, some rare bursts, called superbursts, last several hours and release about 1000 times more energy, and some other intermediate bursts have occasionally been observed with decays of a few tens of minutes. The superbursts are thought to arise from carbon shell flashes in the layers below the surface of the neutron star, while the intermediately long bursts are generally explained by the unstable burning of a thick atmospheric layer of pure helium.

On February 13, 2011, the Danish-built X-ray monitor JEM-X onboard the INTEGRAL satellite observed for the first time a superburst, which occurred from the Galactic bulge low-mass X-ray binary SAX J1747.0-2853. This event is also noticeable in light-curves from the MAXI all-sky monitor onboard the International Space Station. Three days earlier, a flare at GeV energy was detected by the Fermi/LAT instrument from a position consistent with SAX J1747.0-2853, marking the beginning of a new outburst from this transient X-ray source.

This talk will present the JEM-X data, showing that the superburst is immediately preceded by a 30 minute long burst. This exceptional sequence of events makes this first superburst ever observed from SAX J1747.0-2853 a very peculiar one. In particular, we will discuss the possibility for the intermediate long burst to act as a firestarter for the superburst.