



Contribution ID: 74

Type: **not specified**

Unravelling properties of GX 3+1 through AstroSat observations

Wednesday, April 5, 2023 9:40 AM (15 minutes)

Low mass X-ray binaries hosting weakly magnetized neutron stars (NS-LMXB) are classified as atoll sources and Z sources, based on their correlated spectral and temporal variability properties. Some atoll sources have been reported to exhibit type I X-ray bursts, characterized by a Fast Rise Exponential Decay (FRED) profile. One such atoll source is GX 3+1, which was first discovered in 1964. Since its discovery it has always been observed to be in the soft spectral state and on occasions, has exhibited type I X-ray bursts. The source has been observed for a total of four times by the Soft X-ray Telescope (SXT) and the Large Area X-ray Proportional Counters (LAXPC) on-board AstroSat between October 5, 2017 and August 9, 2018. One of the observations, shows the presence of a type I X-ray burst, having a double peaked profile. We have performed an in depth spectral and temporal analysis using ~ 110 ks data from the SXT and LAXPC instruments on-board AstroSat. In addition to this, we have also performed time-resolved spectral analysis of the type I X-ray burst. Through our analysis, we have estimated and put constraints on the physical properties of the system such as radius of neutron star photosphere, mass accretion rate, source distance, etc. In addition, temporal analysis of the burst showed burst oscillation candidates at ~317 Hz and ~338 Hz during the start and touchdown phase of the burst, respectively. These results will be presented during the conference. These results will be presented during the conference.

Presentation Type

Oral

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Session Classification: Neutron Stars

Track Classification: Neutron Stars