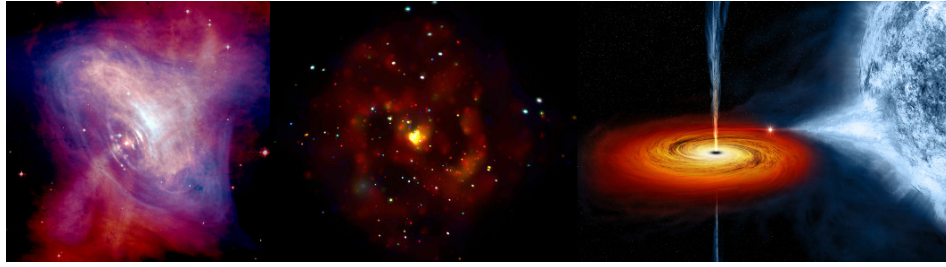


National conference on REcent Trends in the study of Compact Objects  
(RETCO-V): Theory and Observation



Contribution ID: 112

Type: not specified

## AstroSat and NICER view of Be/X-ray binary 1A 0535+262 & Swift J0243.6+6124

Wednesday, April 5, 2023 10:25 AM (15 minutes)

Be/X-ray binaries represent the largest population of high mass X-ray binaries (HMXBs) consist of a Be star and mainly a neutron star as a compact object. In this talk, I will discuss the results obtained from the X-ray studies of the Be/X-ray binary 1A 0535+262 during the 2020 October giant X-ray outburst using AstroSat. The pulsar was detected at a pulsation period of  $\sim 103.55$  s in the light curve up to 110 keV. We found strongly energy-dependent pulse profiles with increasing contribution of the pulsing component in hard X-rays. The broadband spectral fitting in the 0.7-90.0 keV range confirmed the presence of the known cyclotron resonance scattering feature at  $\sim 46.3$  keV. I will also discuss Swift J0243.6+6124, the first galactic ultraluminous X-ray source discovered during 2017-18 giant outburst studies. Currently, we are using Neutron Star Interior Composition Explorer (NICER) data to investigate the post-giant (Type II) outburst phase. We performed timing and spectral analysis covering four normal (Type I) outbursts. The pulsation period is detected around 9.8 s. QPOs are detected in the power spectra for a particular luminosity range. The break frequency evolved in a V-shape with luminosity. The pulse profiles were found to be luminosity dependent. The 1.2-10.0 keV spectra were best fitted with an absorbed cutoff power law, and an iron line was required above certain luminosities. The photon index and cutoff energy were found to be correlated with luminosity. We also find the correlation between different timing and spectral parameters to understand the accretion geometry around neutron stars during these outbursts.

### Presentation Type

Oral

**Primary author:** Mr CHHOTARAY, Birendra (Astronomy and Astrophysics Division, Physical Research Laboratory, Navrangpura, Ahmedabad - 380009, Gujarat, India)

**Co-authors:** Dr JAISAWAL, Gaurava (DTU Space, Technical University of Denmark, Elektrovej 327-328, DK-2800 Lyngby, Denmark); Prof. NAIK, Sachindranatha (Astronomy and Astrophysics Division, Physical Research Laboratory, Navrangpura, Ahmedabad - 380009, Gujarat, India); Dr KUMARI, Neeraj (Astronomy and Astrophysics Division, Physical Research Laboratory, Navrangpura, Ahmedabad - 380009, Gujarat, India); Dr NANDI, Prantik (Astronomy and Astrophysics Division, Physical Research Laboratory, Navrangpura, Ahmedabad - 380009, Gujarat, India); Dr JANA, Arghajit (Institute of Astronomy, National Tsing Hua University, Hsinchu, 30013, Taiwan)

**Presenter:** Mr CHHOTARAY, Birendra (Astronomy and Astrophysics Division, Physical Research Laboratory, Navrangpura, Ahmedabad - 380009, Gujarat, India)

**Session Classification:** Neutron Stars

**Track Classification:** Neutron Stars