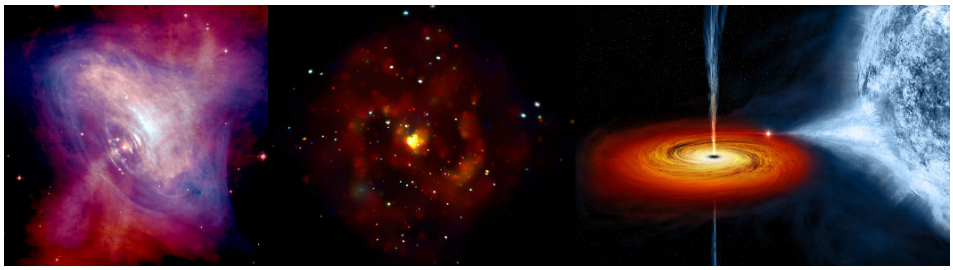

Contribution ID: **76** Type: **not specified**

AstroSat view of Energy-dependent time-lag properties of High Frequency Quasi-periodic Oscillations (HFQPOs) of GRS 1915+105

Monday, April 3, 2023 5:05 PM (15 minutes)

The enigmatic black hole X-ray binary GRS1915+105 exhibits diverse variability patterns (i.e., θ, β, δ, ρ, κ, ω, and γ classes) as observed with AstroSat. We present a generic feature of time-lag properties for the HFQPO observations which belong to the δ, ω, κ and γ variability class. For the first time, we detect soft-lag associated with the 67 Hz HFQPO for all four variability classes of this source using AstroSat observations as compared to the previous findings of hard-lag using RXTE. The soft-lag of the photons in 6-25 keV band w.r.t 3-6 keV band is found to be in the range 0.40-1.68 ms. We find a coherent lag-energy correlation for all variability classes where the soft-lag increases with energy upto 18 keV and decreases with higher energy. The energy dependent time-lag study exhibits maximum soft-lag of ~ 3ms for δ variability class which is the highest among all the variability classes. A generic time lag-rms correlation implies that the soft-lag increases with the rms amplitude of the HFQPO. The spectral analysis of all observations exhibits a linear correlation between optical depth of the Comptonizing medium and the time-lag of the HFQPO. We explain the results in the context of possible accretion models which can reveal the understanding of the responsible physical mechanism that produces HFQPO and corresponding accretion dynamics.

Presentation Type

Oral

Primary author: MAJUMDER, Prajjwal (Rishi Bankim Chandra College, Naihati, West Bengal)

Co-authors: NANDI, Anuj (URSC); Dr DUTTA, Broja G. (Rishi Bankim Chandra College, Naihati, West Bengal)

Presenter: MAJUMDER, Prajjwal (Rishi Bankim Chandra College, Naihati, West Bengal)

Session Classification: Black Hole: Observations

Track Classification: Black Hole: Observations