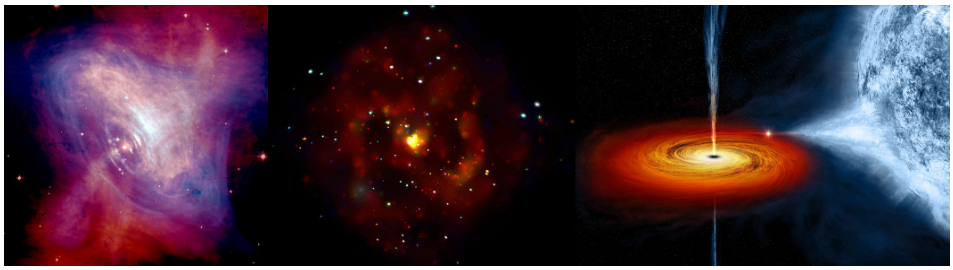

Contribution ID: **49** Type: **not specified**

Revealing the accretion scenarios of BH-ULXs with XMM-Newton

Wednesday, April 5, 2023 12:15 PM (15 minutes)

We present the results of a comprehensive long-term spectro-temporal analysis of nine ultra-luminous X-ray sources (ULXs) with the central object being a black hole, using XMM-Newton monitoring of about a decade. Temporal studies reveal the existence of short-term variability in each source with fractional variance varying in the range of $1.42 - 27.28$ per cent. Five sources of the sample are found to exhibit Quasi-periodic Oscillations (QPOs) with frequency $\sim 8 - 667$ mHz. The thermal Comptonization component along with a disc component is found to be the best description of the energy spectra in $0.3 - 10$ keV energy range over other models. Some of the sources are found to exhibit a negative correlation between luminosity and disc temperature ($L_{\rm disc} \propto T_{\rm in}^{-\alpha}$), whereas rest of the sources show clear positive correlation ($L_{\rm disc} \propto T_{\rm in}^{+\alpha}$). A detailed spectro-temporal correlation study indicates significant contribution of Comptonized flux ($50-90\%$) in the total spectral flux as compared to disc contribution ($\sim 50\%$) in presence of QPO features in selected sources. Overall findings based on spectro-temporal correlation studies indicate that possibly Comptonization plays a viable role in the generation of QPOs. In addition, significant long-term spectral evolution is seen in each of the sources, indicating several spectral state transition. Finally, we employ a model formalism based on the relativistic, viscous, optically thin, advective accretion flow around black hole to infer the mass of the central black hole using the observed QPO frequency and luminosity of the selected ULXs.

Presentation Type

Oral

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Session Classification: ULX Sources

Track Classification: ULX Sources