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The Homogeneous MeerKAT & Swift XRT Radio:X-ray Plane

The radio:X-ray plane is a valuable tool to better understand the connection between accretion and jet production in X-ray binaries during their hard spectral states. This correlation was originally believed to be universal and observed to span many orders of magnitude in X-ray flux. It was later extended to active galactic nuclei by including an additional mass term. However, doubt has since been cast over its universality, as many 'outliers'have been found that do not follow the so-called 'standard'correlation, and instead seem to populate a separate track.

Thus far, all large studies of the radio:X-ray plane have combined data from various telescopes, thereby introducing errors when the fluxes are converted to a common frequency. In addition, these results are impacted by differing systematic errors across telescopes, and mistakes that have been propagated in the literature. Therefore, questions remain regarding whether there truly is a separate track, or whether the outliers are simply manifestations of a scatter in the correlation.

ThunderKAT was a five-year programme on the MeerKAT telescope which monitored outbursting X-ray binaries. It ran in conjunction with SwiftKAT, which collected quasi-simultaneous Swift XRT observations of these sources. Using these data, we have compiled the largest, homogeneous radio:X-ray plane for X-ray binaries to date. I will present the results of this study, addressing whether multiple populations truly exist, the possible influence of Doppler boosting, and what the refined correlation reveals about accretion and jet physics. This will be accompanied by a public data release.

Contribution

Oral talk

Affiliation

University of Oxford

E-mail

justine.crook-mansour@physics.ox.ac.uk

Author: CROOK-MANSOUR, Justine (University of OXford)

Co-authors: FENDER, Rob (University of Oxford); Dr HUGHES, Andrew (University of Oxford)

Presenter: CROOK-MANSOUR, Justine (University of OXford)

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