Title

X-KAT: relativistic jets in our galaxy

Abstract

Relativistic jets are amongst the most important and powerful phenomena in astrophysics, and yet also amongst the least understood. Most well known in the context of supermassive black holes (BH) in active galactic nuclei, relativistic jets are also the underlying mechanism behind gamma-ray bursts and LIGO neutron star merger afterglows, and a fundamental component of Tidal Disruption Events. Stellar mass (<20 M) black holes and neutron stars in binary systems, known as 'X-ray binaries' (XRBs), are the local, lower-mass, and hence faster-evolving analogues to AGN, as well as being the direct descendants of GRBs and on the same mass scale as the LIGO merging BH. The near scale-independence of accretion and jet formation with BH mass, theoretically expected and observationally established, demonstrates that what we learn from XRBs is applicable to more massive systems such as AGN. Observations of neutron star (NS) XRBs provide a perfect control sample to test the effects of a solid surface and intrinsic magnetic field on models of BH accretion and jet formation. Hence radio observations of X-ray binaries are the most important probes of relativistic jet formation in our galaxy and the local universe, and in this field our MeerKAT programme is outperforming every other extant radio array. We request 150 hr per year for up to four years, to continue, evolve and develop this programme at the cutting edge of relativistic jet research on the road to the SKA.