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Measuring the True Occurrence Rate of Jets in TDEs via Late-Time MeerKAT Observations

Abstract

Transient accretion onto a supermassive black hole (SMBH) through the tidal disruption of a stray star offers a unique opportunity to study the birth and evolution of relativistic jets, and to probe the environment around previously dormant SMBHs. Tidal disruption events (TDEs) have long been predicted to produce optical/UV/soft X-ray transient emission from the newly-formed accretion disk, but in the past few years we have shown that some TDEs can also launch radio-emitting relativistic jets. However, the true prevalence of jets in TDEs remains unknown, as most jets will be viewed off-axis and thus their radio emission will be relativistically beamed away at early times. To measure the true beaming-corrected rate requires: (i) a larger sample of TDEs observed at late times (>1 year) after their jets have decelerated, and (ii) deep radio follow-up. Here, we propose observations of a sample of 6 late-time TDEs (>2 years) with MeerKAT. Three are previously detected, including one of three known relativistic TDEs; our observations here will measure the evolving jet properties at poorly-studied late times. Additionally, we also propose observations of 3 TDEs without known radio emission to search for off-axis jets in those systems.