

## **An observational perspective on tidal disruption events**

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When a star passes too close to a supermassive black hole (SMBH) it can be destroyed, temporarily increasing the accretion rate onto the SMBH. Such tidal disruption events (TDEs) produce bright flares across the electromagnetic spectrum that provide a unique window into the central region of a galaxy, including the previously dormant black hole. Jets and ejections from SMBHs that host active galactic nuclei usually evolve on long (10s-100s of years) timescales, however, TDEs provide a rare chance to view the formation and evolution of nascent jets and outflows on ~month long timescales. TDEs thus are powerful tools in answering currently open questions such as: How are jets formed around a black hole? How much energy is liberated in jets and outflows vs how much is gained by the SMBH? Radio observations probe the jets and outflows that may be produced, but few TDEs (<20) have been monitored extensively in the radio band. The apparent dichotomy in radio properties of TDEs is not well-understood, with ~4 orders of magnitude difference in radio luminosity between non-relativistic and relativistic events, and nor is the mechanism that produces the radio emission in most TDEs.

In this talk I will present an overview of the radio and optical follow-up campaign we have been conducting of a selection of TDE candidates, including SRG/eROSITA X-ray selected sources. I will discuss our follow-up strategy with the Australian Compact Array Telescope, Very Large Array, and ANU 2.3m Wide Field Spectrograph, including an overview of the TDEs we have observed. I will present detailed radio and optical observations of two TDEs we have been following for 2-3 years. These radio spectral observations with a cadence of two months enable detailed constraints of the evolution and physical properties of the outflow that was produced, as well as predictions about the circumnuclear environment of the host galaxy. I will review the current state of observations of TDEs, and discuss the insight that we have obtained into the underlying mechanism that launches jets and outflows from black holes, the circumnuclear environment of distant galaxies, and the accretion process in the ultra-strong gravitational fields that exist around supermassive black holes.

**35 word summary:**

I will provide an overview of observations of tidal disruption events - what happens when a star is destroyed by a supermassive black hole - including insights that these events enable into SMBHs and their surroundings.