Title

Continued MeerKAT monitoring of ZTF22aaajecp/AT2022cmc: exploring the differences between thermal and non-thermal electron populations

Abstract

Tidal disruption events (TDEs) are rare, multi-wavelength transients that allow astronomers to probe otherwise quiescent supermassive black holes. They occur when a star gets too close to a supermassive black hole (SMBH), as the star approaches the SMBH, intense tidal forces overcome the gravity keeping the star together. Approximately half of the disrupted material is thought to be lost and the other half falls back and is accreted onto the SMBH. In a small fraction of TDEs, a highly relativistic jet is launched. To date, there have been five TDEs in which we have observed luminous, non-thermal radio emission consistent with a relativistic jet. The most recent of these is ZTF22aaajecp/AT2022cmc. First detected in February 2022, AT2022cmc has been the target of multi-wavelength monitoring campaigns over the last year including high cadence radio observations which provided the first conclusive proof that the low-frequency emission we observe is in fact from a highly relativistic jet. At higher frequencies, there is evidence that the radio counterpart to AT2022cmc originates from a thermal population of electrons, at odds with what is expected for such a highly relativistic jet. We are requesting four epochs over the coming observing term each consisting of 1 hour at L-band and 1 hour at S4-band to monitor the low frequency emission from AT2022cmc in conjunction with higher frequency observations to understand both the macrophysical properties of the jet as well as the thermal and non-thermal electron populations.