

Title

**Multi-Wavelength Study of Compact Object Populations in Two Globular Clusters**

Abstract

Globular clusters are highly conducive to forming close binary systems. Terzan 5 and Liller 1, with the highest rates of stellar collisions, are prime candidates for understanding the role of dynamical processes in forming compact object binaries. Both clusters are highly obscured in optics, limiting the study of binaries from optical variability. With an accepted JWST proposal, we now have a unique opportunity to observe these clusters in the infrared band, with low extinction and a wide field of view. We propose MeerKAT observations, utilizing simultaneous imaging and beamformed search modes in synergy with JWST. The multi-wavelength observations are promising for identifying exotic tight-orbit pulsar binaries through searches of infrared light curves, followed by a radio search over the Keplerian parameters. Simultaneous observations are essential for identifying transitional millisecond pulsars and dwarf novae. With deep images, we will constrain the populations of ultracompact binaries and cataclysmic variables. These multi-wavelength simultaneous observations will cover stellar populations that are challenging to probe with radio observations alone and hence help answer critical questions about the role of dynamical formation channels in the evolution of compact binary systems.