

Title

MeerKAT observations of Swift J1818.0-1607 to unravel its genesis

Abstract

Deciphering the evolution of neutron stars is a key open question in astrophysics. A key challenge is to connect the evolutionary pathways of various sub-populations of neutron stars, specifically, extremely magnetized neutron stars (magnetars). Unravelling these pathways of magnetars can provide insight into how the most energetic compact objects are created and will probe the star-formation history of our Galaxy. An important diagnostic to achieve this is constraining the ages of known magnetars. Swift J1818.0-1607 is a magnetar discovered in 2020 that straddles the boundary between magnetars and rotationally powered neutron stars. Understanding the evolution of such a source will reveal the connection between the sub-populations of neutron star and provide a coherent picture of neutron star evolution. In this proposal, we propose MeerKAT observations of Swift J1818.0-1607 to characterize the diffuse emission around the magnetar that has been claimed as a super-nova remnant shell. The recent VLBI distance and velocity measurements of the magnetar combined with the MeerKAT observations will confirm or refute the association of the diffuse emission with Swift J1818.0-1607 and provide a complete picture on evolutionary history of the magnetar.