

Title

The Thousand Pulsar Array

Abstract

We propose to extend the Thousand Pulsar Array (TPA) project, which is a highly productive component of the Large Survey Project "MeerTime". Utilising the sub-array capability of MeerKAT allows us to regularly monitor, with a consistent observing setup, a large sample of non-recycled pulsars selected from an unbiased population. With this proposal, we will produce 5 new, multi-epoch, legacy datasets of: (1) pulsar timing parameters, (2) average pulse profiles, (3) sequences of single pulses, (4) measurements of the interstellar medium (ISM), and (5) interferometric images of the TPA pulsar fields. Over the coming 4 years, TPA will address the evolution of pulsars and their properties with time, the interactions of the pulsar magnetosphere with the interior of the star, the geometry and emission processes of the magnetosphere, the interaction of the star with its environment, and the dynamic ISM along multiple lines of sight to the TPA target sources. We are a team of experts with an excellent track record in pulsar science with MeerKAT, we have all the hardware and software needed, from organizing our source lists to processing our data, and we have a successful ongoing programme that guarantees readiness from day 1, while setting the paradigm for large pulsar timing programmes extending into the SKA era. We ask for 780h over 4 years, of which 195h in year 1.