

Title

The MeerKAT Pulsar Timing Array

Abstract

The MeerKAT Pulsar Timing Array (MPTA) collaboration undertakes high-precision observations of millisecond pulsars with the MeerKAT radio telescope. The primary goals of the Array, in operation since 2019, are the detection of nanohertz-frequency gravitational radiation and study of the nanohertz-frequency gravitational-wave sky. To do so, we propose to continue highly-optimised observations of 82 southern millisecond pulsars, producing high quality data sets that we share via regular releases and to the International Pulsar Timing Array (IPTA). The MPTA's unique combination of high cadence, sensitivity, use of an exceptionally well-engineered digital interferometer, an octave of bandwidth, and the rich Southern hemisphere millisecond pulsars make the MPTA dataset one of global significance we are keen to extend. Novel methods to characterise the sources of astrophysical noise present in the data will enable the most sensitive searches for gravitational waves to be undertaken. This will enable us to understand the nature of nanohertz-gravitational wave emitting sources and the demographics of supermassive black holes throughout cosmic time.