Contribution ID: **73** Type: **Contributed talk in mini symposium**

GW Results from the European Pulsar Timing Array

Friday, 15 December 2023 10:00 (10 minutes)

Pulsar Timing Arrays (PTAs) search for nHz gravitational waves by timing the radio signals from a network of stable millisecond pulsars and looking for a spatially correlated common signal in the data set. We expect to find a gravitational wave background (GWB) first, followed by possible individual sources. PTAs have reported the finding of evidence for such a GWB signal in various data sets, namely NANOGrav, Australian PPTA, EPTA+InPTA and CPTA. They coordinate their work together in the IPTA.

The European Pulsar Timing Array has released the second data set DR2 with 25 millisecond pulsars. I will focus on the recent results that the EPTA+InPTA collaborations have published simultaneously in the a coordinated process with NANOGrav, PPTA and CPTA. The EPTA reports a nominal amplitude of 2.5e-15 for a common red signal, which is consistent with the other PTA results. We find a significance of >3 sigmas for the characteristic spatial correlations required for a GWB. This follows a general positive trend across different PTAs with evidences between 2 and 4.6 sigmas in favour of the gravitational wave origin of the common signal. This putative signal can be tested against both cosmological and astrophysical sources for a GWB and be used to put constraints for various theories. The EPTA has also searched for a single resolvable GW source in the DR2. Although, some hints were found, no conclusive detection has been made.

Primary author: CHEN, Siyuan (KIAA, PKU)

Co-author: COLLABORATIONS, The European and Indian Pulsar Timing Array

Presenter: CHEN, Siyuan (KIAA, PKU)

Session Classification: GW Astrophysics