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Title:	The Indian Pulsar Timing Array:
Other Titles:	First data release
Authors:	Bathula, Adarsh (/jspui/browse?type=author&value=Bathula%2C+Adarsh)
Keywords:	millisecond pulsars pulsar timing method astronomy data analysis Timing Array
Issue Date:	2022
Publisher:	Cambridge University Press
Citation:	Publications of the Astronomical Society of Australia, 39(1), e053.
Abstract:	<p>We present the pulse arrival times and high-precision dispersion measure estimates for 14 millisecond pulsars observed simultaneously in the 300 – 500 MHz and 1260 – 1460 MHz frequency bands using the upgraded Giant Metrewave Radio Telescope. The data spans over a baseline of 3.5 years (2018-2021), and is the first official data release made available by the Indian Pulsar Timing Array collaboration. This data release presents a unique opportunity for investigating the interstellar medium effects at low radio frequencies and their impact on the timing precision of pulsar timing array experiments. In addition to the dispersion measure time series and pulse arrival times obtained using both narrowband and wideband timing techniques, we also present the dispersion measure structure function analysis for selected pulsars. Our ongoing investigations regarding the frequency dependence of dispersion measures have been discussed. Based on the preliminary analysis for five millisecond pulsars, we do not find any conclusive evidence of chromaticity in dispersion measures. Data from regular simultaneous two-frequency observations are presented for the first time in this work. This distinctive feature leads us to the highest precision dispersion measure estimates obtained so far for a subset of our sample. Simultaneous multi-band upgraded Giant Metrewave Radio Telescope observations in 300 – 500 MHz and 1260 – 1460 MHz are crucial for high-precision dispersion measure estimation and for the prospect of expanding the overall frequency coverage upon the combination of data from the various Pulsar Timing Array consortia in the near future. Parts of the data presented in this work are expected to be incorporated into the upcoming third data release of the International Pulsar Timing Array.</p>
Description:	Only IISER Mohali authors are available in the record.
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