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## Multi-band Extension of the Wideband Timing Technique

The wideband timing technique enables the high-precision simultaneous estimation of Times of Arrival (ToAs) and Dispersion Measures (DMs) while effectively modeling frequency-dependent profile evolution. We present two novel independent methods that extend the standard wideband technique to handle simultaneous multi-band pulsar data incorporating profile evolution over a larger frequency span to estimate DMs and ToAs with enhanced precision. We implement the wideband likelihood using the libstempo python interface to perform wideband timing in the tempo2 framework. We present the application of these techniques to the dataset of fourteen millisecond pulsars observed simultaneously in Band 3 (300 - 500 MHz) and Band 5 (1260 - 1460 MHz) of the upgraded Giant Metrewave Radio Telescope (uGMRT) as a part of the Indian Pulsar Timing Array (InPTA) campaign. We achieve increased ToA and DM precision and sub-microsecond root mean square post-fit timing residuals by combining simultaneous multi-band pulsar observations done in non-contiguous bands for the first time using our novel techniques.

### Email

avinashkumarpaladi@gmail.com

### Affiliation

Indian Institute of Science

**Authors:** PALADI, Avinash Kumar (Indian Institute of Science); (INPTA), Indian Pulsar Timing Array

**Presenter:** PALADI, Avinash Kumar (Indian Institute of Science)

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