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Observations of pulsar microstructure with the Giant Metrewave Radio Telescope KISHALAY DE, California Institute of Technology, Pasadena, USA, YASHWANT GUPTA, National Centre for Radio Astrophysics, Pune, India, PRATEEK SHARMA, Indian Institute of Science, Bangalore, India — Microstructure emission, involving short time scale intensity fluctuations in subpulse emission, is well known in normal pulsars. However, the high time resolution and sensitivity required to detect these features has limited such studies to only few pulsars, mostly in the northern sky. The Giant Metrewave Radio Telescope (GMRT), owing to its high sensitivity, extensive sky coverage and frequency coverage at low frequencies is an attractive prospect for high time resolution single pulse studies of pulsars. In this paper, we present results from an extensive statistical analysis of the polarization (with single frequency observations) and spectral (with simultaneous dual-frequency observations) properties of microstructure emission in pulsars observed with the GMRT. We further present the first detections of quasi-periodic microstructure emission from millisecond pulsars (MSPs), in GMRT observations of two MSPs at 325 and 610 MHz. We thus extend the microstructure timescale - rotation period relationship by more than an order of magnitude, down to a rotation period of ~ 5 ms. We discuss the physical implications of our results, pointing to a radial / temporal modulation origin of microstructure emission as a likely explanation for the observed characteristics.

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