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## Deepest Upper Limits on the 21 cm Power Spectrum from the Murchison Widefield Array

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The 21 cm hydrogen line is a powerful probe of the intergalactic medium (IGM), enabling us to infer its thermal and ionisation history through statistical fluctuations measured via the power spectrum. In this talk, we present the deepest upper limits on the 21 cm power spectrum at redshifts  $z = 6.5$ ,  $6.8$ , and  $7$ , derived from Murchison Widefield Array observations spanning 2013 to 2023. The total integration time amounts to approximately 657 hours, with the final analysis using a carefully selected 268-hour subset following a rigorous foreground mitigation strategy. These results provide the first evidence for a heated IGM at these redshifts. Furthermore, we show that improved separation of thermal noise and instrumental systematics from residual foregrounds, by analysing non-Gaussian features in the power spectrum distributions, can further enhance our sensitivity.

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