Applications of Fast 21 cm Power Spectrum Estimation

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Abstract: The challenge of 21 cm Cosmology is to tease out faint statistical signals of cosmological hyperfine emission from astrophysical foregrounds several orders of magnitude stronger. This problem requires rigorous statistical tools which in turn need novel implementations to remain feasible when scaled to the size of modern data sets. I present an acceleration to of optimal power spectrum estimation from N^3 to $N \log N$, where N is the number of voxels in an observed data cube. With it, I discuss analysis of data from the Murchinson Widefield Array prototype and project how well current and next generation interferometers will be able to perform interesting astrophysical measurements.

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