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Learning about the first galaxies with 21-cm: the first results from HERA

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The cosmic 21-cm signal observed by the Square Kilometre Array (SKA) will open a new window to the early Universe. 21-cm fluctuations encode the properties of the unseen first galaxies as well as physical cosmology. I will showcase our fully Bayesian inference framework, capable of forward-modeling 4D realizations of cosmic 21-cm lightcones. I will demonstrate how this framework was recently applied to preliminary results from the Hydrogen Epoch of Reionization Arrays (HERA). The preliminary HERA limits already allowed us to constrain the IGM thermal evolution and X-ray luminosities of the first galaxies. In particular, we find that the first galaxies must have been more X-ray efficient (with a higher X-ray luminosity to star formation rate) than local ones, consistent with theoretical predictions of High Mass X-ray Binaries (HMXBs) in low metalicity environments.

Reasearch area

Epoch of Reionization

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