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Empirical Constraints for the Theory of Pop III Star Formation

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Understanding the formation of the first (Pop III) stars at the end of the cosmic dark ages is one of the outstanding problems in modern cosmology. Based on numerical simulations, an increasingly detailed theoretical framework has emerged for how this happened. The key challenge now is to test our ideas with frontier observations over the next decade. The James Webb Space Telescope promises in-situ observations of hyper-energetic Pop III supernovae and possibly gamma-ray bursts. Other powerful probes are provided by 21cm cosmology, highlighted by the recent EDGES discovery of a global absorption spectral feature, and the unresolved cosmic infrared background. Ideally complementary are a number of fossil signatures, scrutinized in our local neighbourhood. Prime among them is the chemical abundance pattern left behind by Pop III nucleosynthesis in old, metal-poor stars. Finally, binary black hole remnants of massive Pop III progenitors may be detectable by LIGO through their gravitational wave signal.

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Talk/Poster

Talk

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