

Detecting Population III Stars with HARMONI on the ELT (Kearn Grisdale) (I)

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Instruments like HARMONI on the ELT will likely be able to observe the first spatially resolved spectra of the very earliest ($z \sim 10$) galaxies. Contained within these spectra will be details of the very first and as of yet unobserved stars, i.e. Population III stars. Detecting the emission from Pop. III stars would provide significant insight into star formation, galaxy formation and evolution in the early Universe. Using NewHorizon, an AMR-hydrodynamical cosmological simulation, in combination with published SEDs for Pop. III stars and full radiative transfer (i.e. the Yggdrasil Models and CLOUDY) I am able to compute and simulate the flux of the He II 1640 line, a tracer of the presence of Pop. III stars, produced by the simulation.

In this talk I will demonstrate:

- How mock observations of Pop. III stars can be produced.
- That Pop. III stars should be observable in galaxies for redshifts between 10 and 3.
- How such observations can be used to rule out different Pop III models when combined with real observations from the HARMONI on the E-ELT.

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Track Classification: Galaxy Stellar Populations and star-formation histories