

Observing high-redshift stars through gravitational lensing (Jose M. Diego)

Studying single stars at cosmological distances is possible if the distant star is located near the caustic of a gravitational lens. This was proven possible recently with the observation of a star at redshift 1.49, Icarus, in Kelly et al. (2018) that was being lensed by the combination of a powerful lens (the galaxy cluster MACS1149) and a microlens inside the cluster. This type of alignments are more common than previously thought and observations that reach sufficient depth should reveal more events of even more distant stars. 30-m class telescopes will be able to reach the required depth (m_{AB-30}) needed to see numerous lensed stars beyond redshift 1. These events can be used not only to study the background stars but also the substructure near the critical curves in the foreground lenses. In particular, we show how this type of observations will constrain the fraction of dark matter in the form of primordial black holes at LIGO masses below the 1% level.

Primary author: Mr DIEGO, Jose M. (IFCA)

Track Classification: Galaxy Stellar Populations and star-formation histories