

Observing the diffuse the cosmic web

Dr. Nicolas Tejos, UC Santa Cruz

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Modern analyses of structure formation predict a universe tangled in a 'cosmic web' of dark matter, galaxies and diffuse baryons.

Galaxies seem to follow the predicted cosmic web, but they only account for a small fraction ($\sim 10\%$) of baryons in the Universe.

The vast majority of baryons reside in the intergalactic medium (IGM), but its actual three-dimensional distribution remains poorly constrained. In this talk, I will present observational results on the properties and distribution of the IGM in the cosmic web. I use data from HST/COS UV spectroscopy of background QSOs to observe the neutral hydrogen (HI) in absorption as a tracer of the IGM, together with optical spectroscopy to observe galaxies in emission as tracers of the cosmic web. By cross-matching the position of individual HI absorption line systems to those of different large scale structures traced by galaxies (e.g. voids, filaments, clusters), I characterize the IGM in different cosmic environments. Specifically, I will present results on the properties of the IGM: (i) around normal star-forming and non-star-forming galaxies; (ii) within and around galaxy voids at $z < 0.1$, that trace low- and mean-density environments respectively; and (iii) high-density environments traced by galaxy cluster pairs.