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Cold gas in distant galaxies

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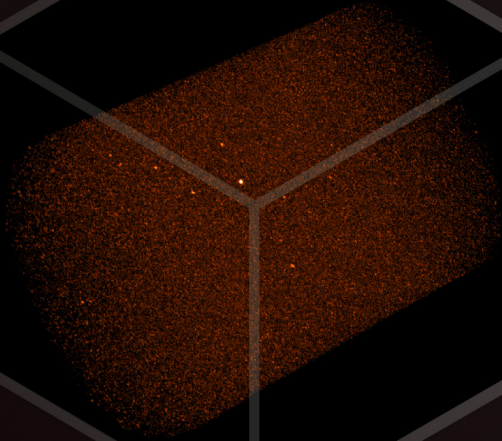
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Cold Gas in Distant Galaxies

Cold Gas in Distant Galaxies

Leindert Boogaard



The formation and evolution of galaxies is fundamentally driven by the formation of new stars out of cold gas. Observations of young stars in distant galaxies in the early universe, such as we can see in the Hubble Ultra Deep Field, have unveiled how the cosmic star formation rate density evolves. Yet, while the effect of star formation—the young stars—has been mapped in ever-increasing detail, the cause—the cold molecular gas that fuels star formation—has been elusive. This thesis presents an observational study of the cold interstellar medium of distant galaxies in the early universe, using the most sensitive submillimeter telescope to date, the Atacama Large Millimeter Array, together with new integral-field spectrographs, such as the Multi Unit Spectroscopic Explorer on the Very Large Telescope. It unveils the physical properties of star-forming galaxies and their molecular gas reservoirs, and describes the evolution of the cosmic molecular gas density—the fuel for star formation.

Leindert Boogaard