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The Dynamic, Multi-Phase Nature of Early Galaxies: Insights from ALMA and JWST

Monday, January 5, 2026 11:00 AM (25 minutes)

In this talk, I will present Chile-based efforts, carried out in close international collaboration, to understand how, where, and when galaxies evolve across cosmic time. By combining observations from ALMA and JWST/NIRCam+NIRSpec, we are investigating the multi-phase interstellar medium (ISM) in galaxies on kiloparsec scales during the first billion years of the Universe. These studies reveal a remarkable diversity of kinematic behaviors—from rotationally supported disks to complex, merger-driven motions—challenging simplified models of early disk formation. We also find widespread [CII]-traced cold gas outflows, extended gas and dust morphologies, and evidence of obscured star formation well beyond the UV-bright regions. Together, these results highlight the dynamic, multi-phase nature of early galaxy evolution and showcase how Chile's growing role as a global center for observational astronomy enables transformative research on galaxy assembly in the early Universe.

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