

ALMA2019: Science Results and Cross-Facility Synergies



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An ALMA survey of CO in submillimetre galaxies

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Contributed talk

Abstract:

The results of previous ALMA observations have given us many valuable constraints for theoretical models of protoplanetary disks (PPDs) and the formation of planets within them. While only a few years ago such dust maps suggested the mere presence of embedded planets in PPDs, via the detection of rings and gaps in the continuum emission, I will argue in this talk that, at increased resolution, they can by now also inform us about the planet's dynamical behavior. It has been shown that a Neptune-sized planet in a disk with a low level of turbulence creates a pattern of three concentric rings in the dust components. We find from numerical simulations that the mutual separations of these three rings depend critically on if and how the planet is radially migrating. Inward or outward migration, as well as different migration speeds all leave characteristic signatures on the structure of the dust in the PPD. By presenting synthetic images of the executed theoretical studies, I will highlight that these structures are in principle observable (as shown by Pérez et al. 2019) when pushing ALMA to its highest resolution. The importance of the understanding of migration for our picture of planet formation cannot be overestimated, since it links the planet's final location to its original birth place. Collaborators: Sebastián Pérez, Simon Cassassus, Oliver Gressel, Pablo Benitez-Llambay, Leonardo Krapp

Presenter: Dr WARDLOW, Julie

Session Classification: Cosmology