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Planet formation in the JWST era

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Observations of circumstellar disks have revealed a striking array of substructures potentially linked to the formation of protoplanets. Despite considerable efforts, ground-based near-infrared imaging has identified only two protoplanets in the iconic PDS70 system, along with a handful of candidates. The James Webb Space Telescope (JWST), with its unprecedented sensitivity in the 4-12 micron range, presents novel opportunities for investigating the formation of planets.

In this presentation, I will share the exciting results of a series of JWST programs focused on studying protoplanetary disks and young, forming planetary mass companions using both the Mid-Infrared Instrument (MIRI) and the Near-Infrared Camera (NIRCam), including the detection of protoplanet candidates associated with scattered light spirals and the first mid-infrared characterization of a circumplanetary disk. These findings carry significant implications for our understanding of formation and evolution of planetary systems.