Caught in the act of dispersing their disks? MIRI MRS can tell

Scientific Category:	Exoplanets and Exoplanet Formation
Scientific Keywords:	Chemical Composition, Circumstellar Disks, Exoplanet Formation, Protoplanetary Disks (Extrasolar)
Alternate Category:	Stellar Physics and Stellar Types
Instruments:	MIRI
Proposal Size:	SMALL
Exclusive Access Period:	12 months
Allocation Information (in hours):	
Science Time:	12.6
Charged Time:	18.0

Abstract

Transition disks are planet-forming disks with large dust gaps or cavities, from a few to tens of au. Based on spectrally resolved 12.8 micron [NeII] profiles, several of them have been also found to drive slow (~5 km/s) winds, compatible with star-driven photoevaporative flows. Regardless of whether the gaps/cavities are created by planets or photoevaporation, these systems might be in the unique stage of dispersing their disks. However, line profiles alone cannot exclude MHD winds which might drive evolution but not dispersal. Here, we propose MIRI MRS observations of two transition disks with a large dust cavity (>30 au in radius) and a small (=<4 au) inner disk plus evidence for a slow [NeII] wind. MIRI MRS is the only instrument that can spatially resolve [NeII] emission near or exterior to the cavity radius as expected in the photoevaporative wind scenario. Along with [NeII], we will map the emission from other forbidden and H recombination lines to constrain the ionization fraction of the flowing gas, hence wind mass loss rates. Our project will establish how much time is left for planet formation and migration in these two systems and provide a pathfinder for future observations aiming at clarifying how disks disperse.