JWST Observations of Young protoStars

First results on high- and low-mass protostars with MIRI

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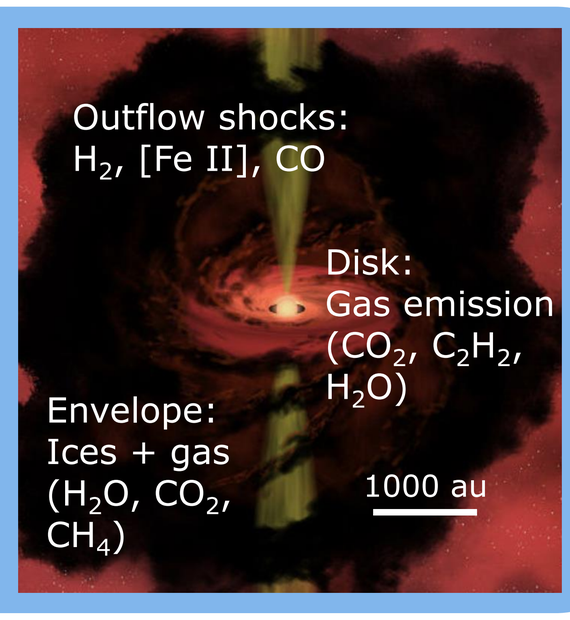
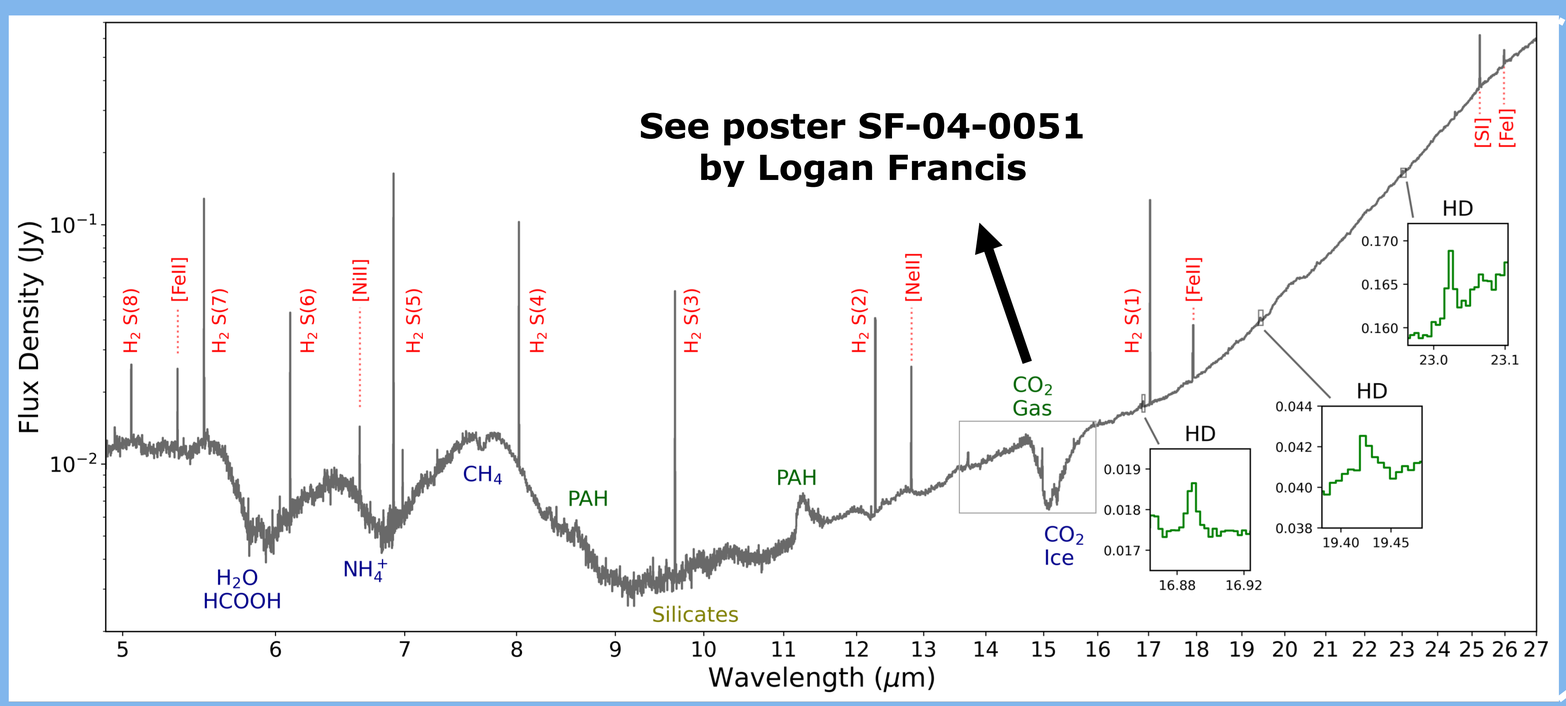
Main goals of the program

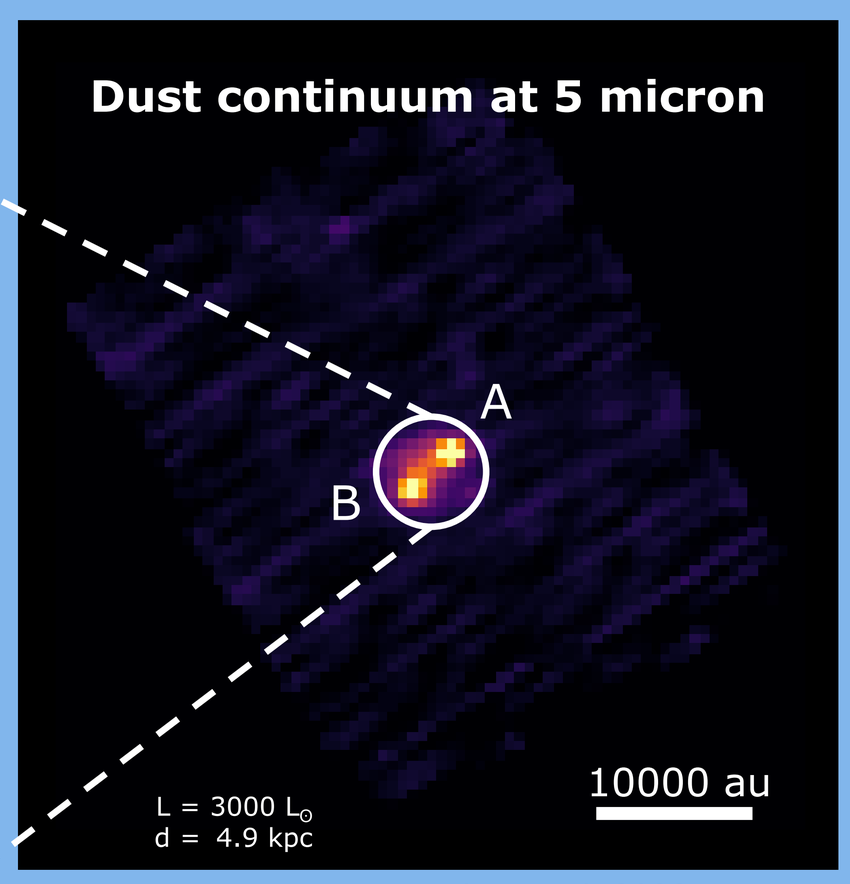
- Probe the ice composition in protostellar envelopes and link this to the composition in the gas phase
- Determine the physical properties of outflows and jets and relate this to episodic accretion and the jet launching region
- Measure the warm molecular composition in the inner regions of *young and embedded* disks
- Compare low-mass to high-mass protostellar systems



High-mass protostellar system: IRAS 23385+6035

The MIRI-MRS instrument provides the full 5-27 micron spectrum at unprecedented resolution and sensitivity!





Beuther et al. 2023, in press

JOYS+ sample

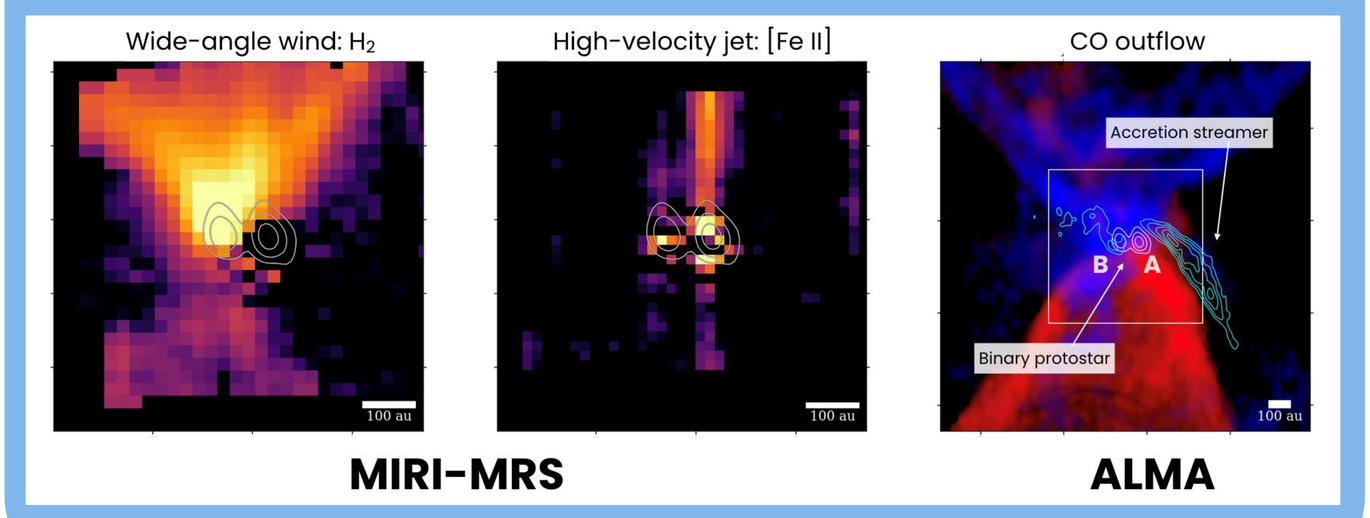
JOYS+ targets more than 30 Class 0 and Class I protostellar systems with JWST-MIRI and NIRSpec by combining the following programs:

- MIRI GTO 1290: ~20 low mass, 5 high-mass protostars (PI: EvD)
- MIRI GTO 1236: 10 binaries in Perseus (PI: Ressler)
- MIRI GTO 1257: HH 211 outflow large mosaic (PI: Ray)
- GTO 1186, GO 1960: NIRSPEC for the same 20 low-mass protostars as 1290 (PI: Greene, EvD)

Low-mass protostar: winds and jets

Binary protostar showing different outflow behavior between its components:

- Source A: High-velocity jet traced by [Fe II]
- Source B: Wide angle disk wind with H_2 tracing outflow cavity walls and disk surface



Tychoniec et al. 2023, in preparation

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Link to first JOYS papers:
arxiv.org/abs/2303.13172
vD et al. 2023, Faraday Discussions, in press
JOYS website:
miri.strw.leidenuniv.nl