# HIRMES: HIgh Resolution Mid-infrarEd Spectrometer

## Facility Class, High Res, Mid-Infrared Spectrometer

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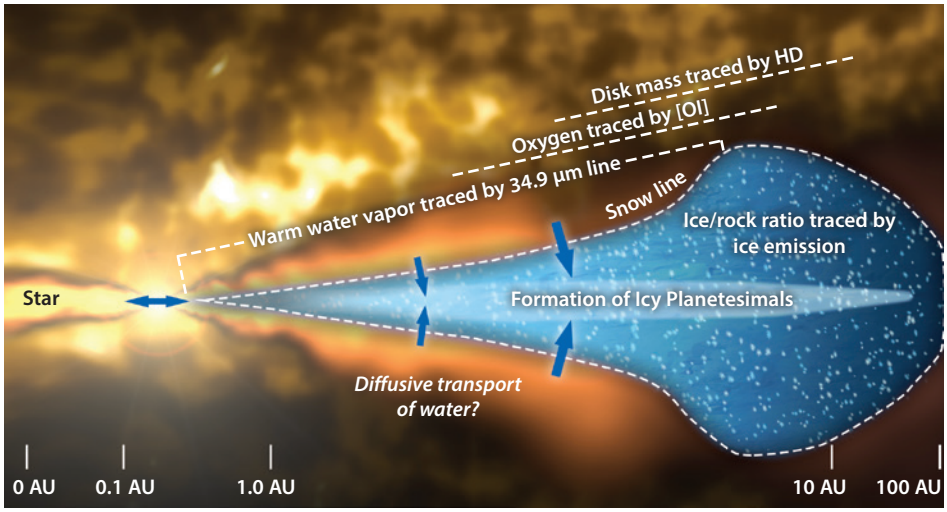
### Protoplanetary Disk Physics

HIRMES will aim to study the evolution of protoplanetary systems. Shocks resulting in ionized gas emission lines due to mass accretion lead to star and planet formation. Features of particular interest include water lines and ice, [OI] as a tracer of disk chemistry and radial structure, and HD as a tracer of disk mass. While Herschel and Spitzer focused on tracing intensity and spatial profiles, HIRMES will expand on this to yield spectral profiles by resolving these lines and determining their origins from velocity profiles, which are key components of shock models.




HIRMES is currently in development.

## Specifications

HIRMES employs background limited bolometers and a combination of Fabry-Perot interferometers and gratings. As a direct detection spectrometer, HIRMES has no inherent quantum noise limit. Furthermore, bolometers have >90% quantum efficiency over reasonably broad bands and lack generation recombination noise as compared to photoconductors (i.e. increased sensitivity).

The Low, Mid, and Imaging Spectroscopy modes use a 16x64 MoAu TES bolometer pixel array and the High mode uses a 8x16 pixel array. The Imaging Spectroscopy mode has a wide field of view to enable large scale mapping of nearby galaxies in fine-structure line emission.

**Observing Specs**

| λ Range | Diffraction Limited |
|---|---|
| 25 – 122 μm | λ ≥ 30 μm |

**Spectroscopic Capabilities**

| Mode | Spectral Resolution |
|---|---|
| Low | 325 – 635 |
| Mid | ~ 12,000 |
| High | 50,000 – 100,000 |
| Spectral Imaging | ~ 2,000 |