Star & Planet Formation with NGST

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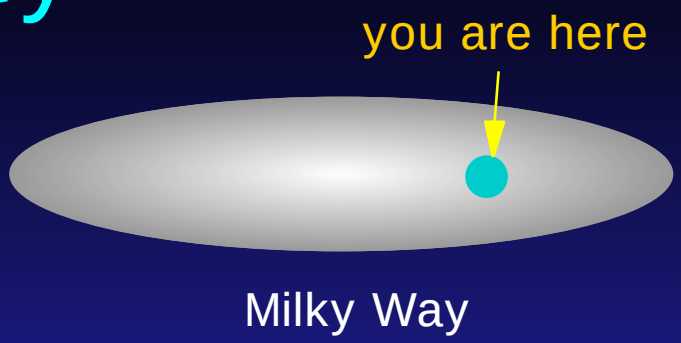
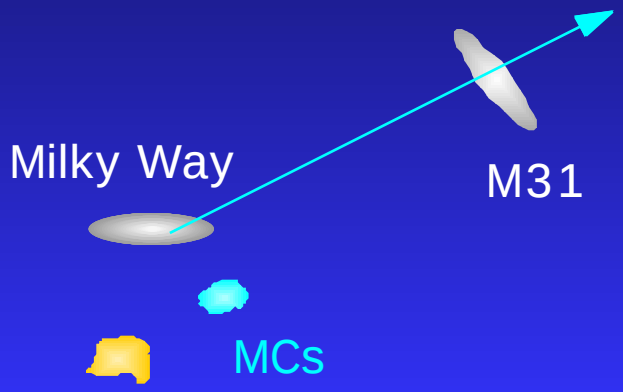
NGST Enabling Science

- Sensitivity in thermal infrared
  - bring low-mass objects into view
  - extend observable distance to galaxies
- Angular resolution & dynamic range
  - image giant planets close to young stars
  - image faint, old disks

NGST Sensitivity

- Limiting mag in 1hr
  - 3 μm ♦ 25.9^m
  - 20 μm ♦ 21.4^m
- Distances:
  - T Tauri disks:
    - 5.8 Mpc (3 μm)
    - 0.5 Mpc (20 μm)
  - TT photosphere:
    - 0.9 Mpc (3 μm)
    - 45 kpc (20 μm)





Priorities for Star Formation

- Baseline mission
- Extend to 25 μm
- Provide coronagraphic imaging
- Extend to ≤0.5 μm

Star Formation with NGST

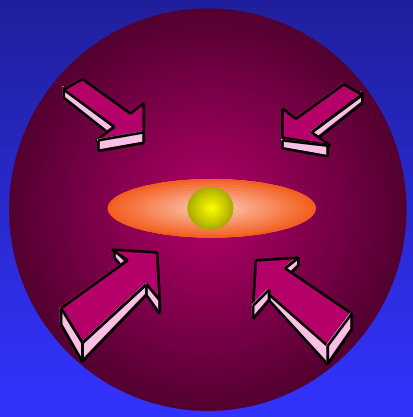
- Initial Mass Function: 1 M_{Jup} - 1 $M_{\odot}$
- Protostars
- Disks & Planets

Star Formation with NGST

- Initial Mass Function: "planets"
  - detecting objects: $1M_{Jup}$ to $1M_{\odot}$
  - fragmentation & predictions about IMF

Star Formation with NGST

- Protostars
  - Uncovering transient states, huge A_V
  - Spectroscopy of accretion shocks



Protostar:
- age < 10^4 yr
- $M_{envelope}$ » M_{star}
- A_V > 100

Star Formation with NGST

- Disks & Planets
  - imaging giant protoplanets
  - imaging disks & jets
  - structure & planets in nearby disks