

Origin of Stellar and Sub-stellar Mass Objects

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GSMT SWG Meeting

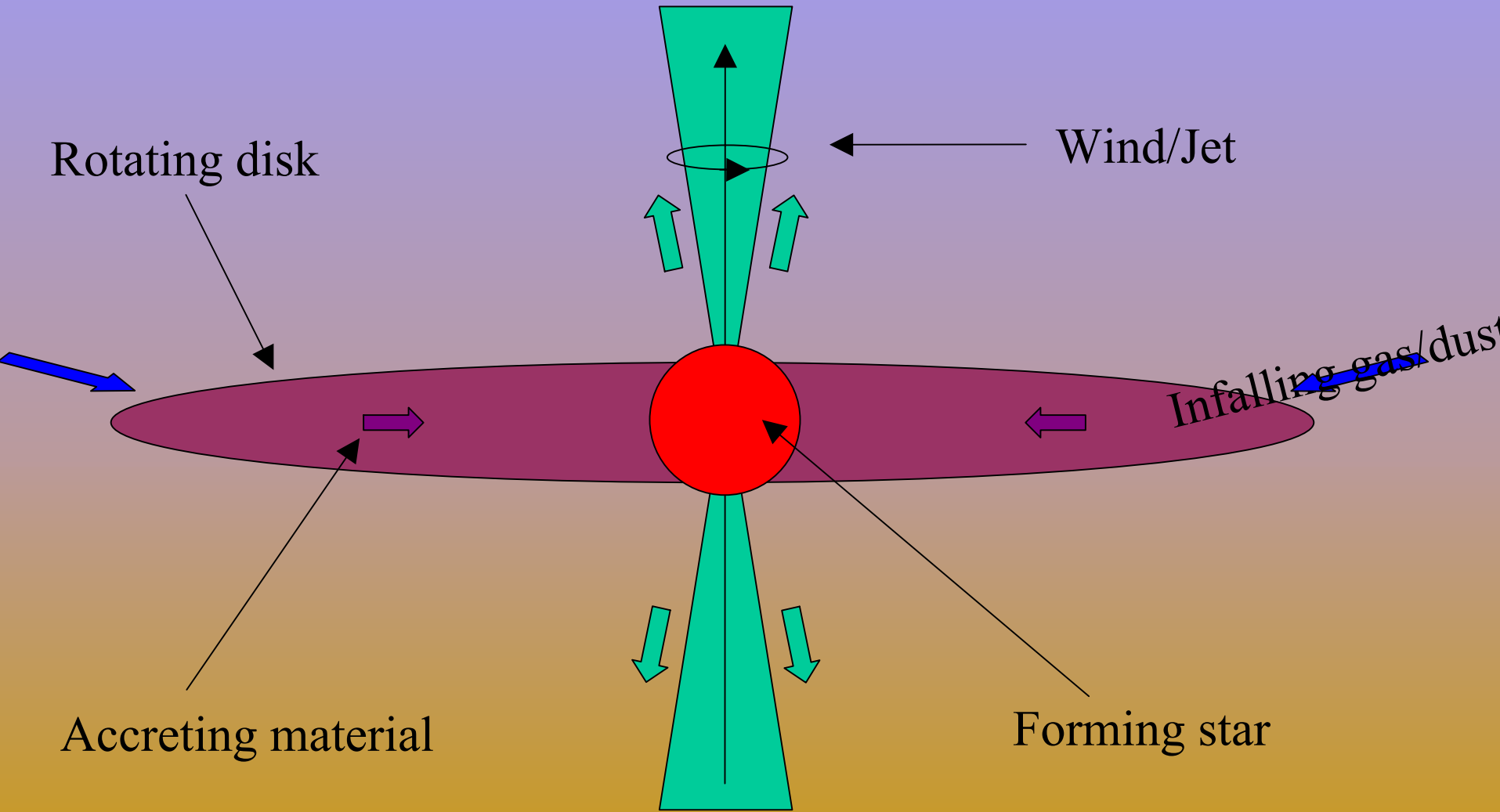
Honolulu, HI

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Key Questions

- What determines the initial masses produced by the star formation process?
 - Role of fragmentation?
 - Role of density and metallicity?

Building a Star



JWST Role

Photometry (JHKLN) & Spectroscopy (R=300):

- Create HRD and measure IMF
 - To few M_J in 10 nearby (< 1 kpc) regions
- Search for evidence of fragmentation
 - Peak in IMF at $\sim 10 M_J$

Moderate Resolution Spectroscopy (R=3000)

- Measure atmospheric chemistry of substellar objects

GSMT Role

- Focus: do initial conditions (e.g., density and metallicity) affect IMF at stellar masses?
 - Study systems \gg 1 kpc away at predominantly stellar masses
 - Utilizes high angular resolution to resolve crowding
- Measure atmospheric chemistry of substellar *companions*
 - *Using coronagraphic imaging and spectroscopy*

GSMT Advantages

- High spectral resolution matched to intrinsic line widths and typical velocities at $d \sim 100\text{-}1000$ AU
- High angular resolution well-matched to dimensions of disk-envelope system