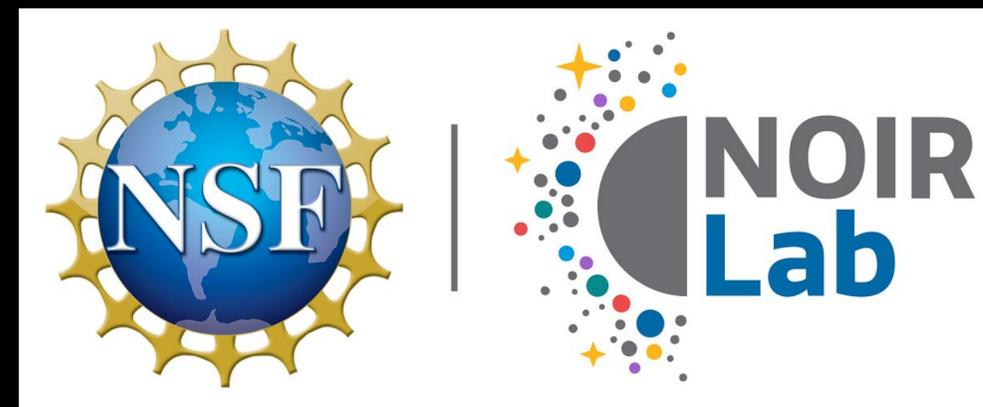


A Survey of Pre-Main-Sequence Stars and Massive T-Tauri Protoplanetary Disks with the Gemini Planet Imager

- Evan Rich
- John Monnier (Principle Investigator)
- Gemini-LIGHTS Collaboration

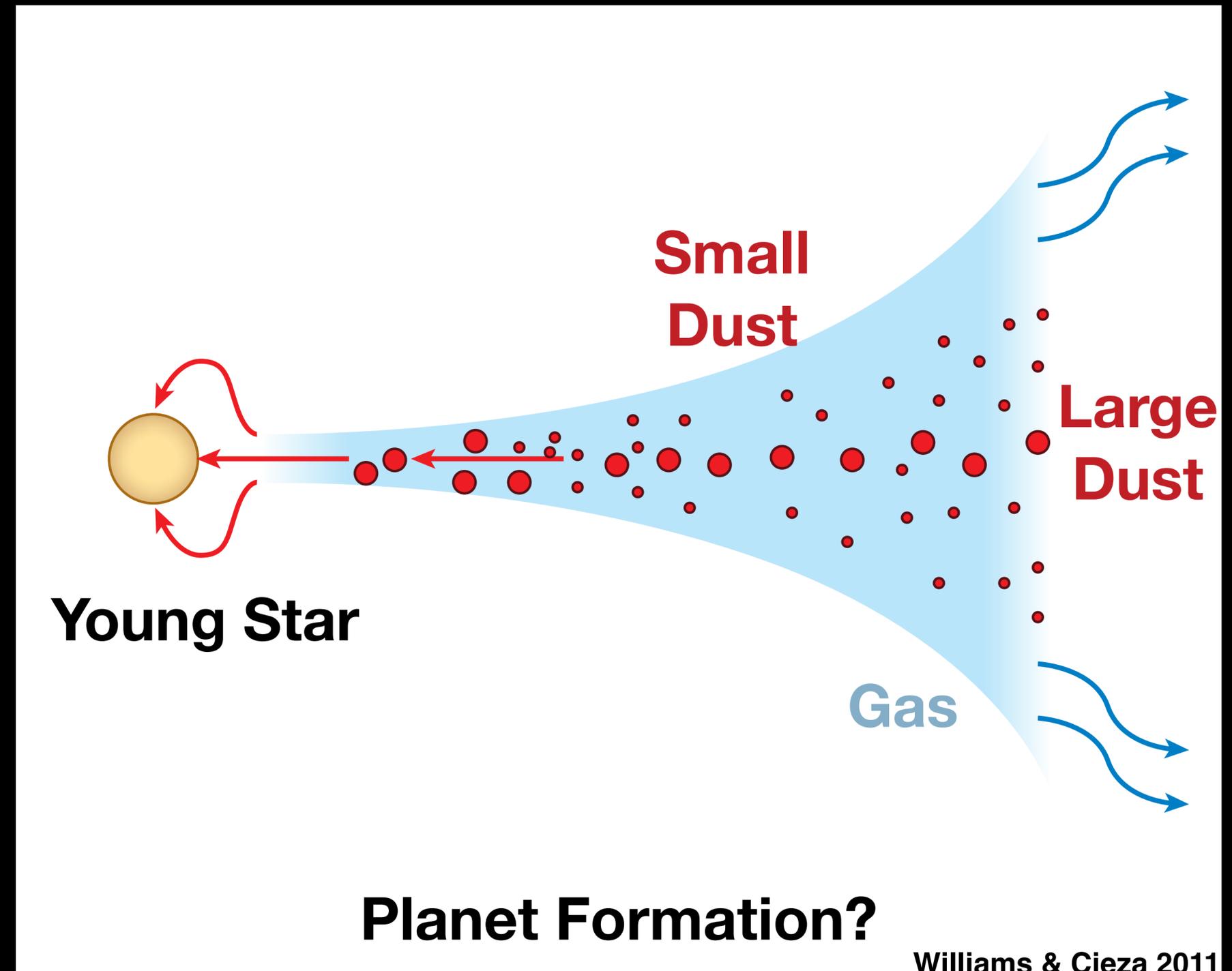


NOIRLab Press Release: <https://noirlab.edu/public/news/noirlab2212>

How do planets form and what affects their formation?

- Planets form in disks around young stars
- Planet-forming disks composed of:
 - Gas
 - Small Dust
 - Large Dust

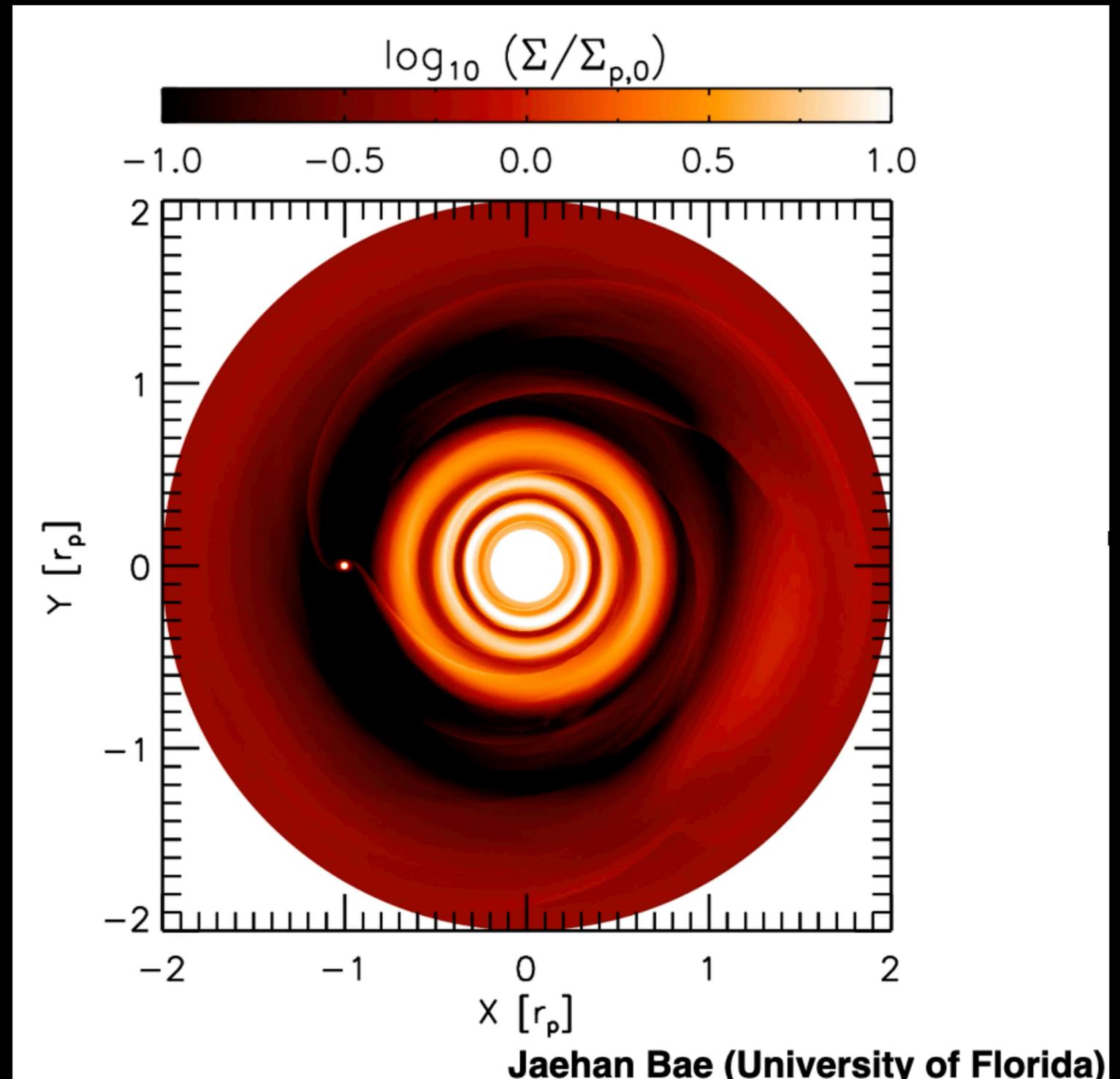
Problem!
Imaging forming planets are really hard to find with current technology



Indirectly tracing planet formation with small dust grains

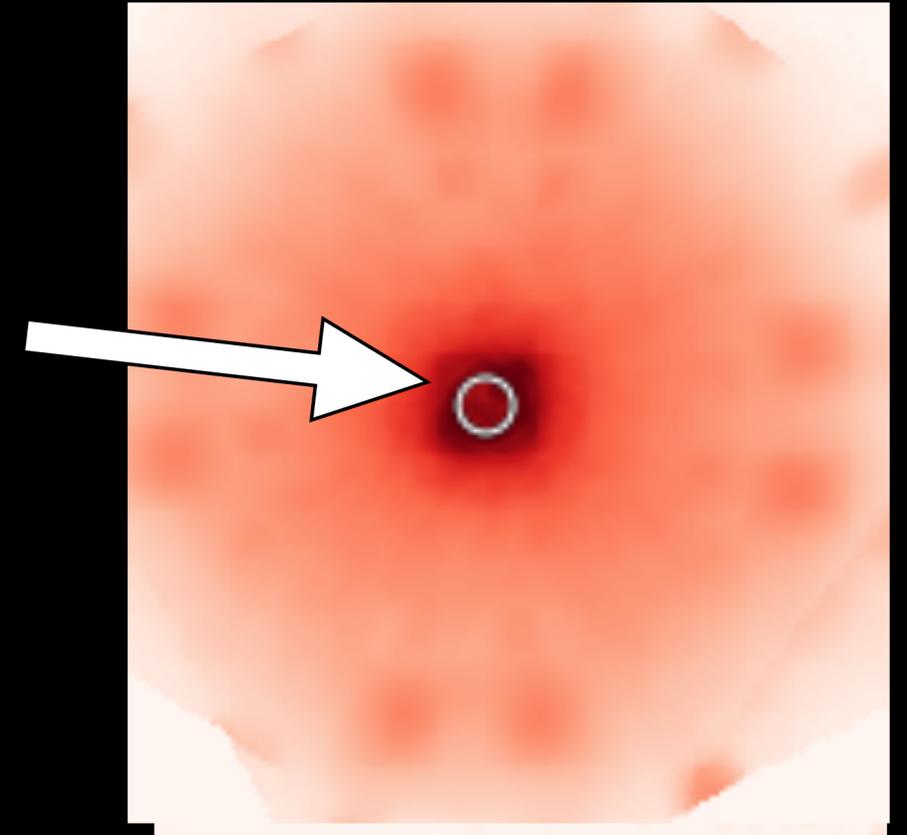
Use small dust grains (~1 micron) as a tracer of planet-forming material

- Planet affects the dust morphology (distribution) in the disk.



Stars are bright, Dust is not...

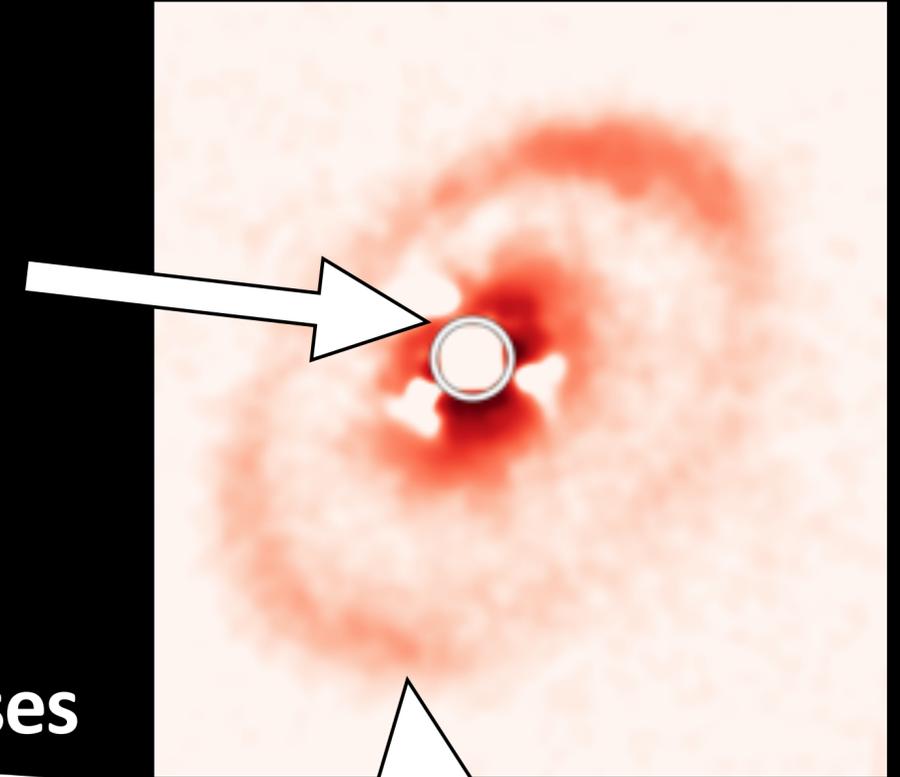
Unpolarized Light
from Star Removed



Evan Rich (University of Michigan)

Stars are bright, Dust is not...

Unpolarized Light
from Star Removed



Polarized Sunglasses



Polarized Light
from Small Dust

Evan Rich (University of Michigan)

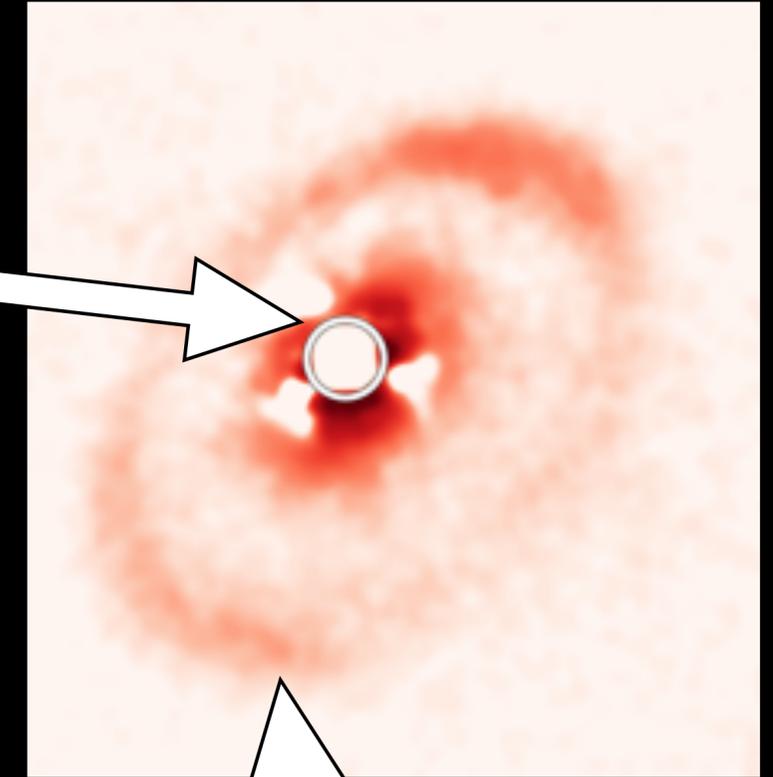
Stars are bright, Dust is not...



Observations with the Gemini Planet Imager instrument on the Gemini South Telescope in near-infrared and polarized light.

International Gemini Observatory/NOIRLab/NSF/AURA/B. Tafreshi

Unpolarized Light
from Star Removed



Polarized Sunglasses



Polarized Light
from Small Dust

Evan Rich (University of Michigan)

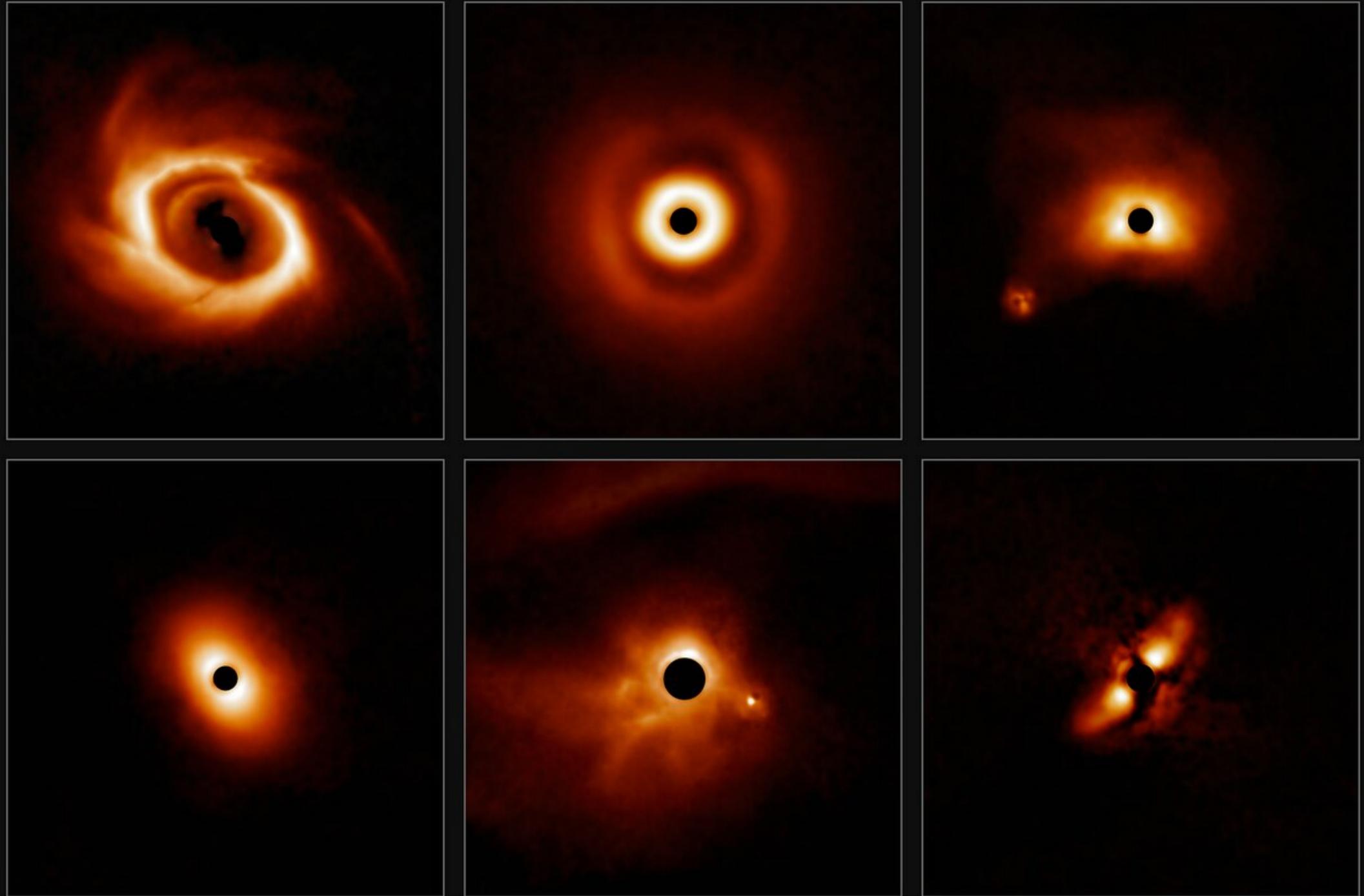
Contact Email: earich@umich.edu

AAS 240th

Wed June 15th 2022

Gemini - Large Imaging with Gpi Herbig/T-Tauri Survey Gemini-LIGHTS

- The first study concentrated on imaging more massive stars
- We do not find **ringed structures** for **stars 3x more massive** than the Sun



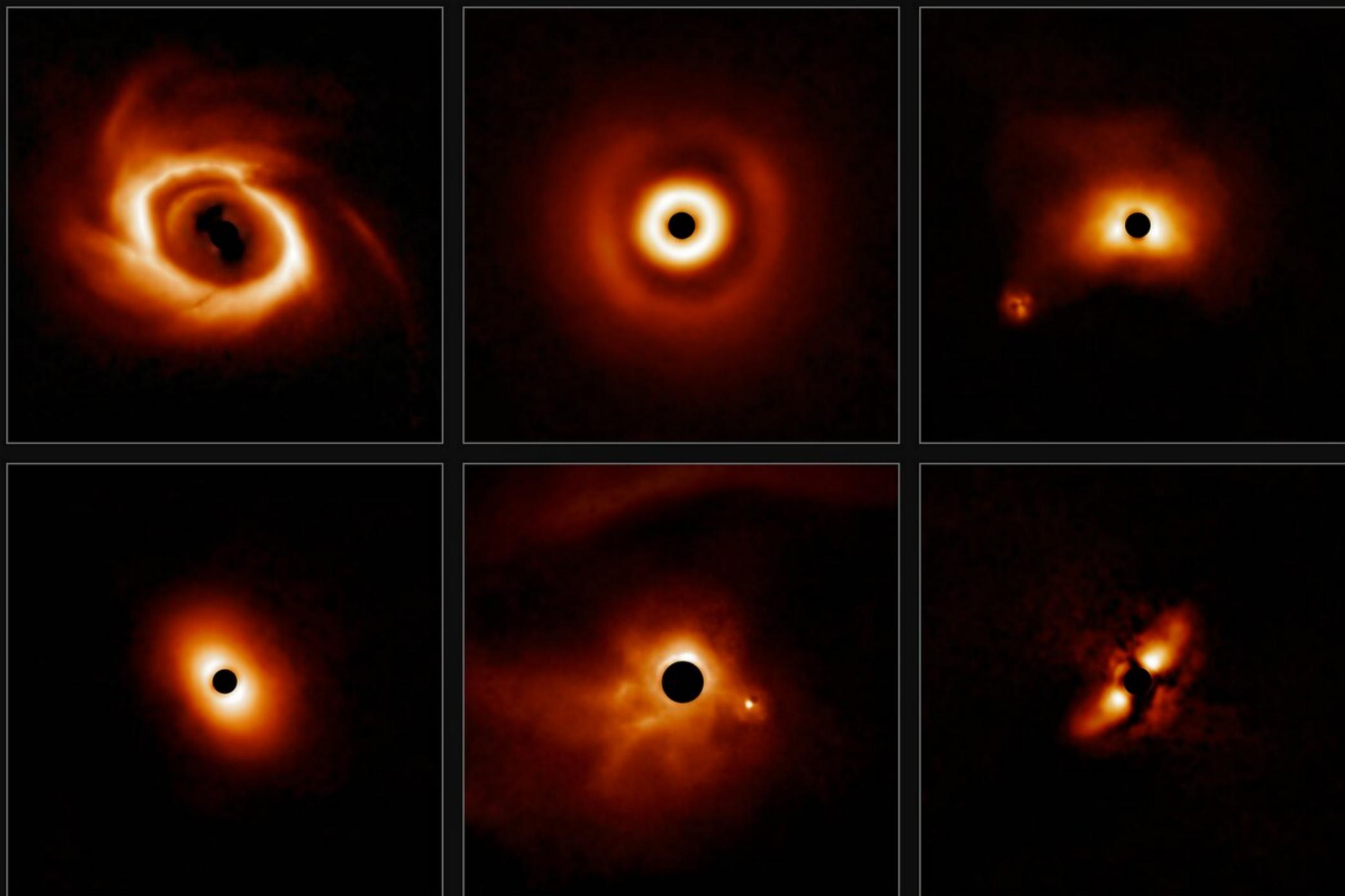
International Gemini Observatory/NOIRLab/NSF/AURA/E. Rich (Michigan University)

Gemini - Large Imaging with Gpi Herbig/T-Tauri Survey

Gemini-LIGHTS

Possible Reasons:

- Binaries affecting the disk?
- Higher temperatures affecting ice?
- Observational Bias?
- Too young to form rings?



International Gemini Observatory/NOIRLab/NSF/AURA/E. Rich (Michigan University)

Gemini-LIGHTS Survey

- The first imaging survey concentrated on higher-mass stars hosting planet-forming disks.
- Find that stellar mass may play an important role in the planet-forming process

- Future work on determining why we see a distinction between stars more massive than $3x M_{\text{sun}}$

More Information:

- Paper on ArXiv: <https://arxiv.org/abs/2206.05815>
- Michigan Press Release: <https://news.umich.edu/to-find-a-planet-look-for-the-signatures-of-planet-formation/>
- NOIRLab Press Release: <https://noirlab.edu/public/news/noirlab2212>