

# Probing Massive Star Formation at the Earliest Phases with SOFIA

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John E. Vaillancourt

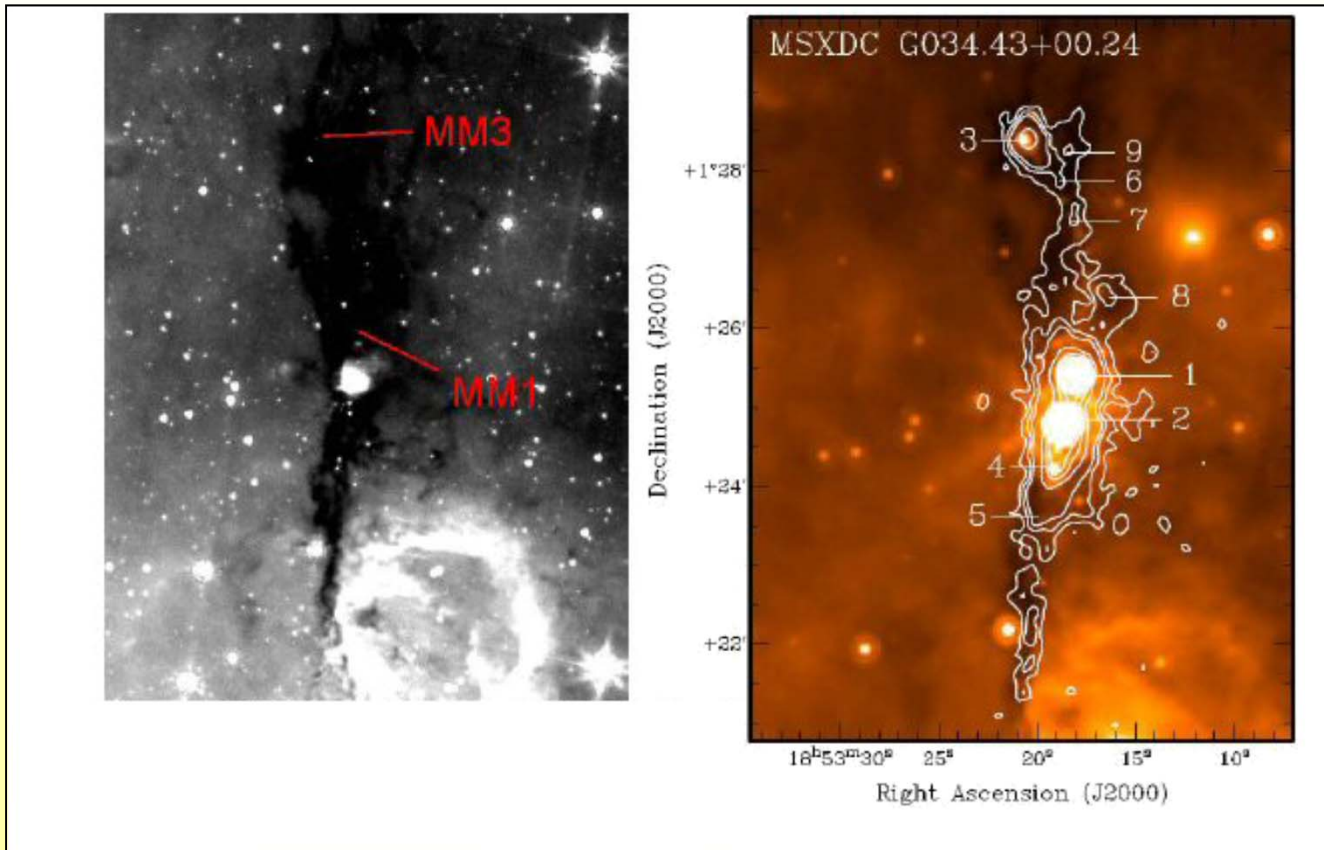
M. Krejny



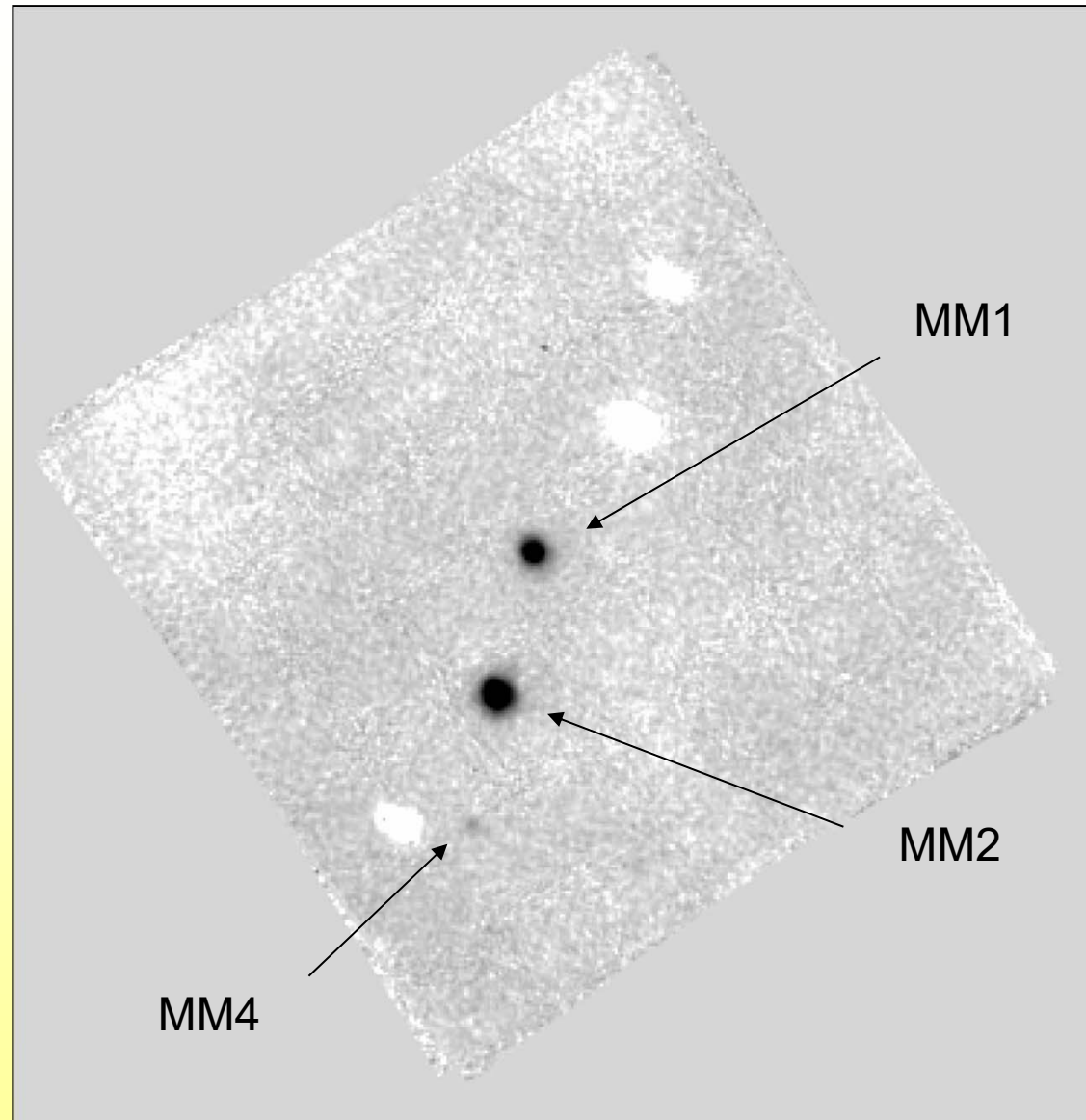
# MM1 in G034.43

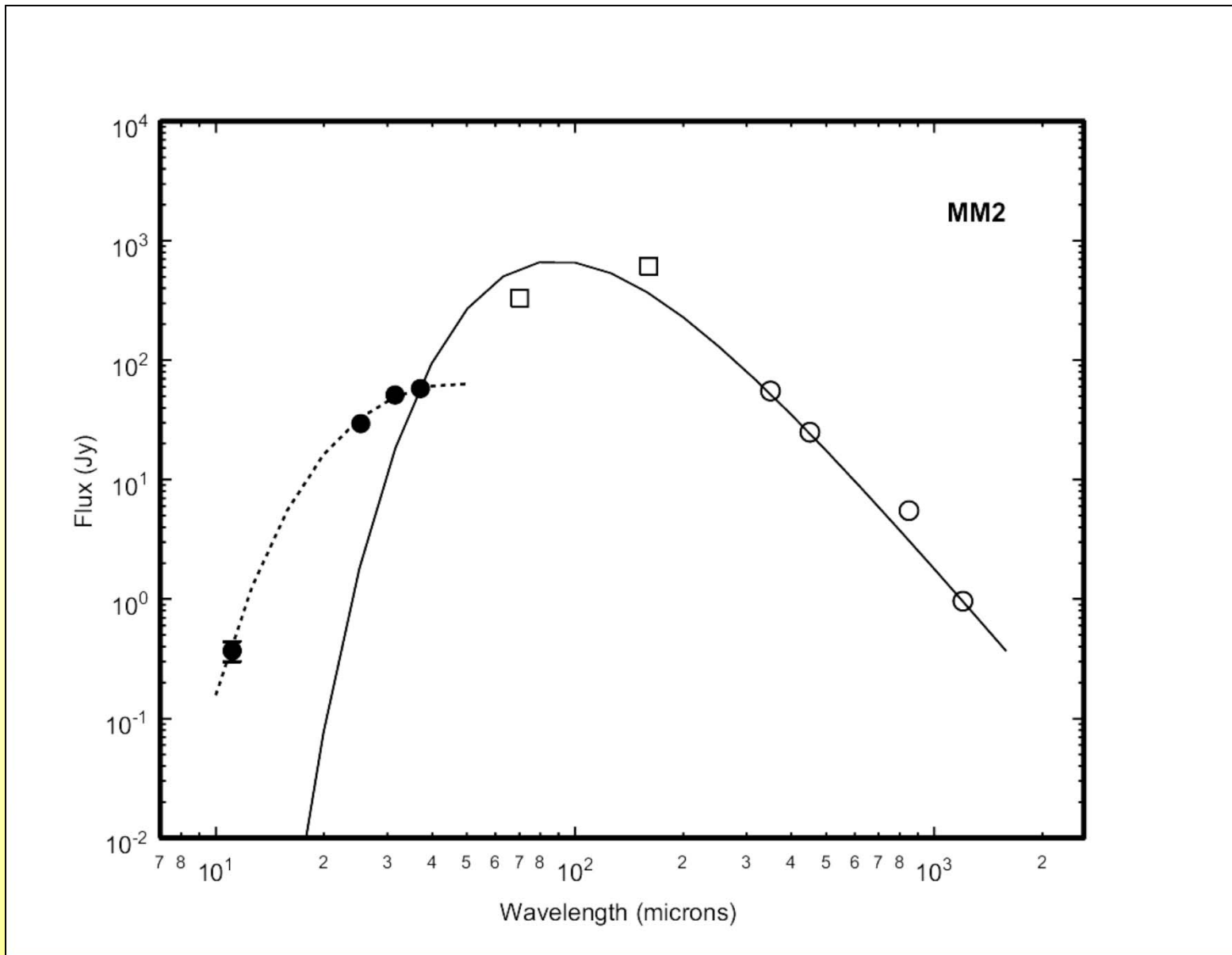
8 microns

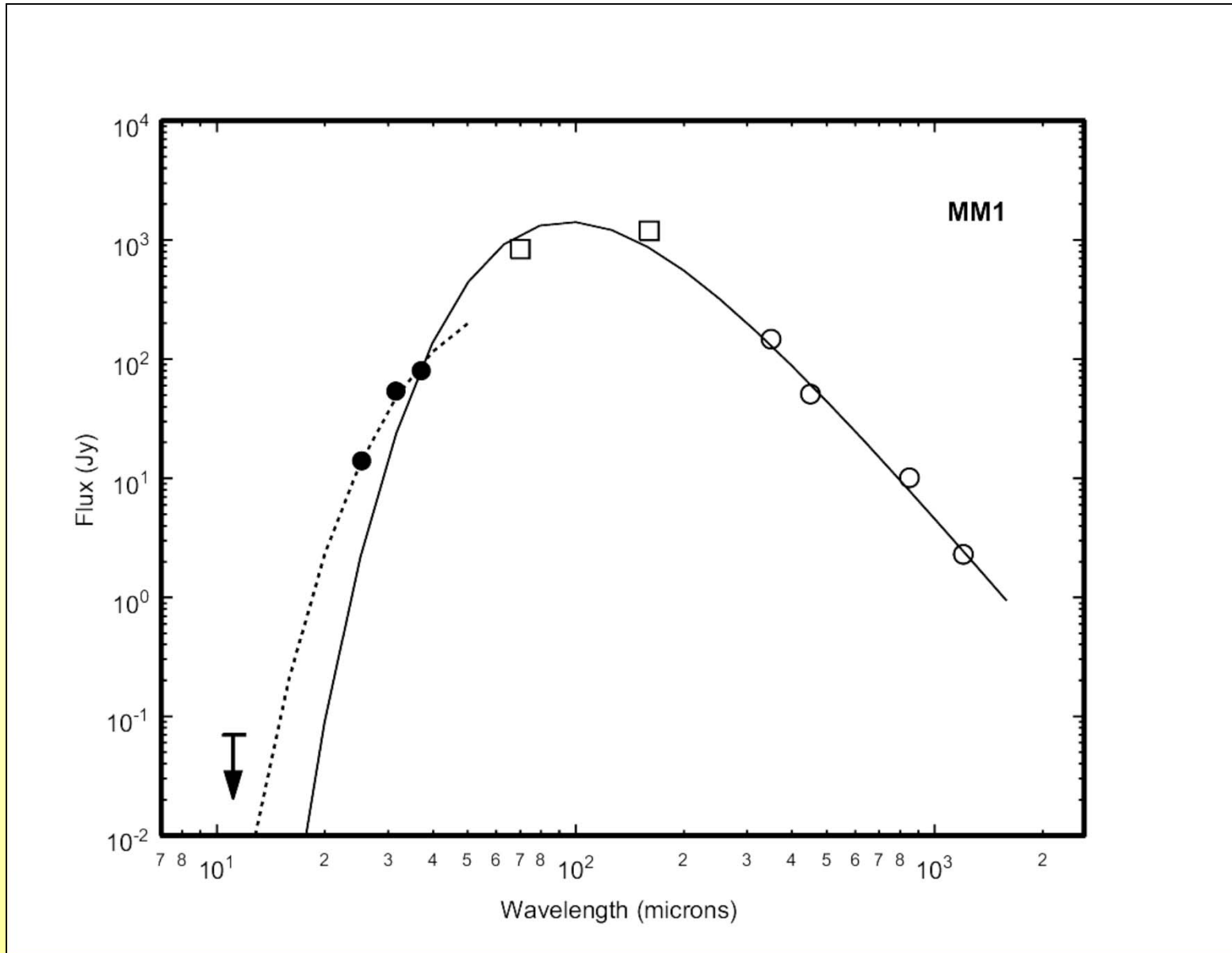
25 microns

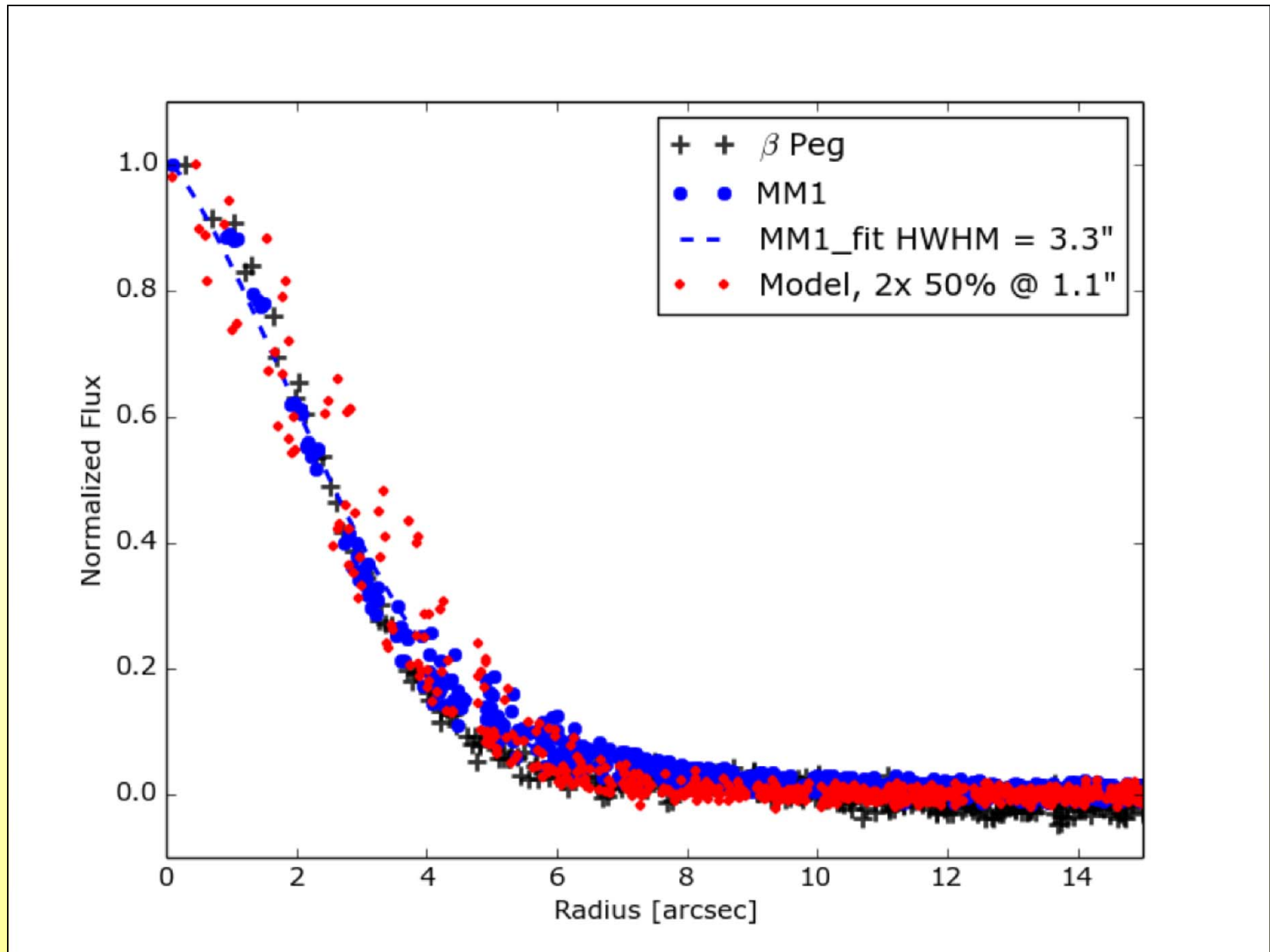


FORCAST 25  $\mu\text{m}$

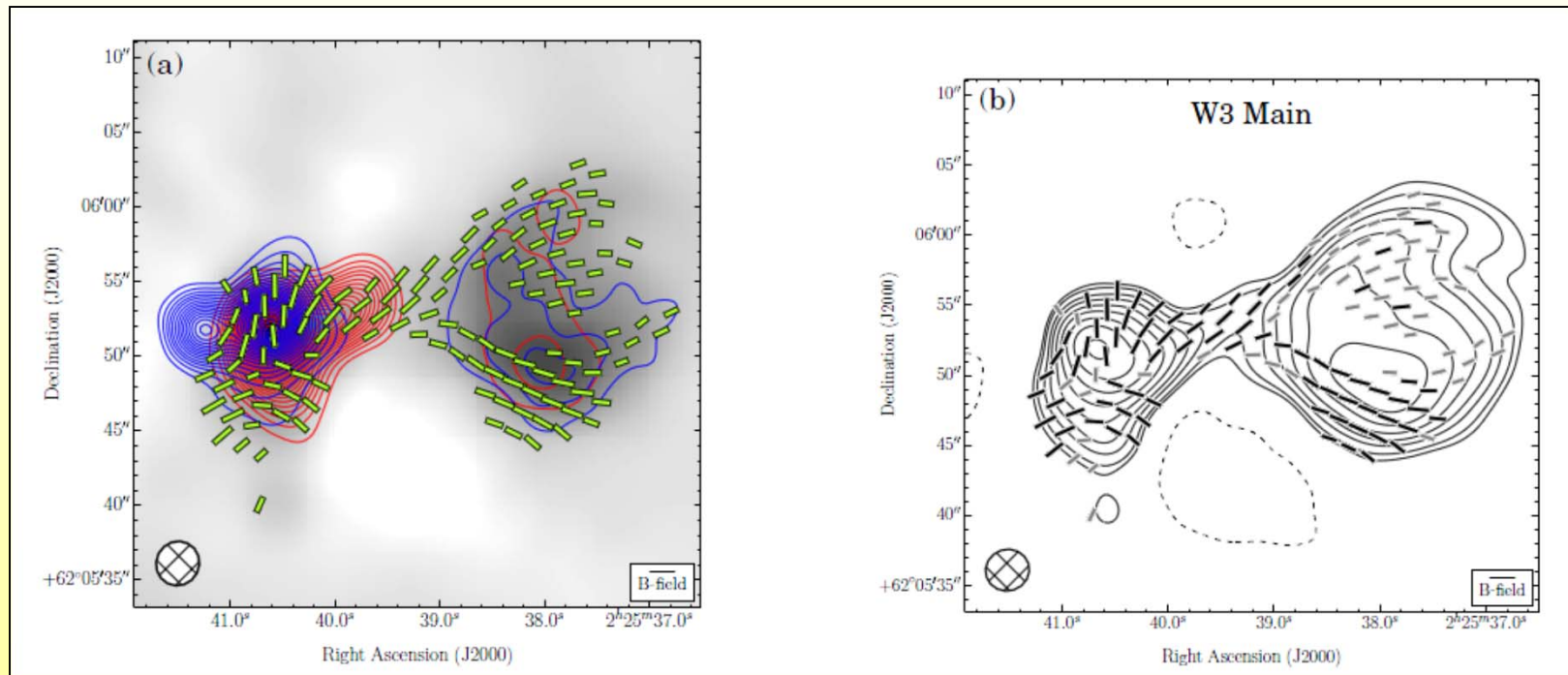








Magnetic Fields are very important in the early stages of star formation.  
Can we reliably probe the magnetic field geometry in YSO cores using polarization from aligned dust grains?



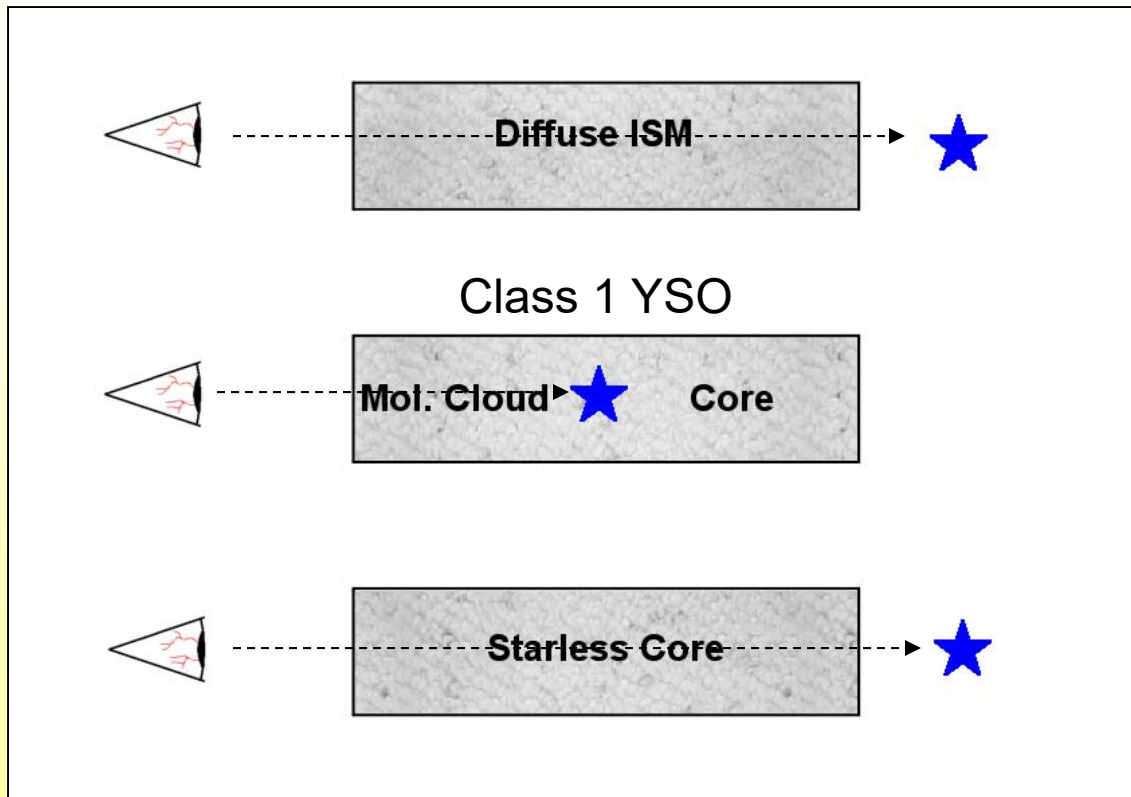
Chat Hull



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# Probing the Magnetic Field Geometry Using Polarimetry



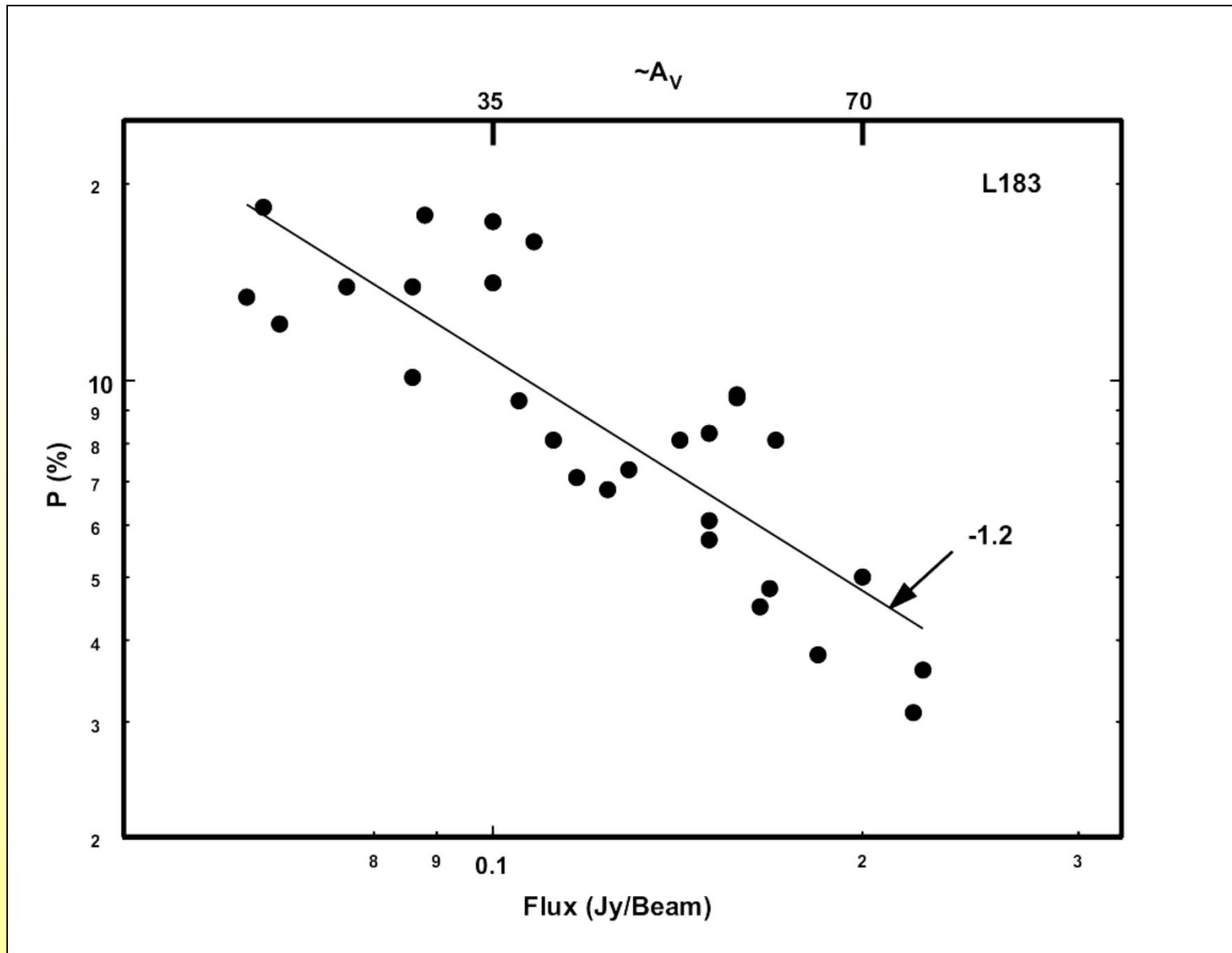
Efficient  
alignment +  
turbulence

Efficient  
alignment +  
turbulence

Alignment up  
To  $A_V \sim 20$



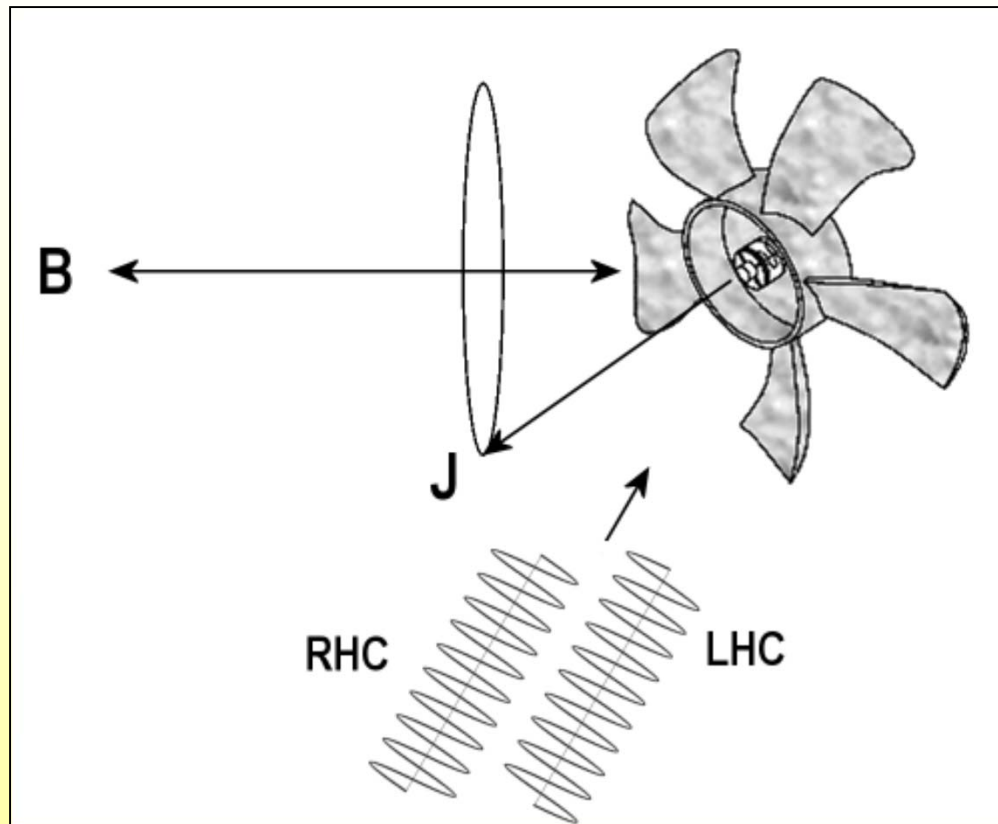




Starless Core, NO Grain Alignment Deep Inside



# Radiative Torque Alignment

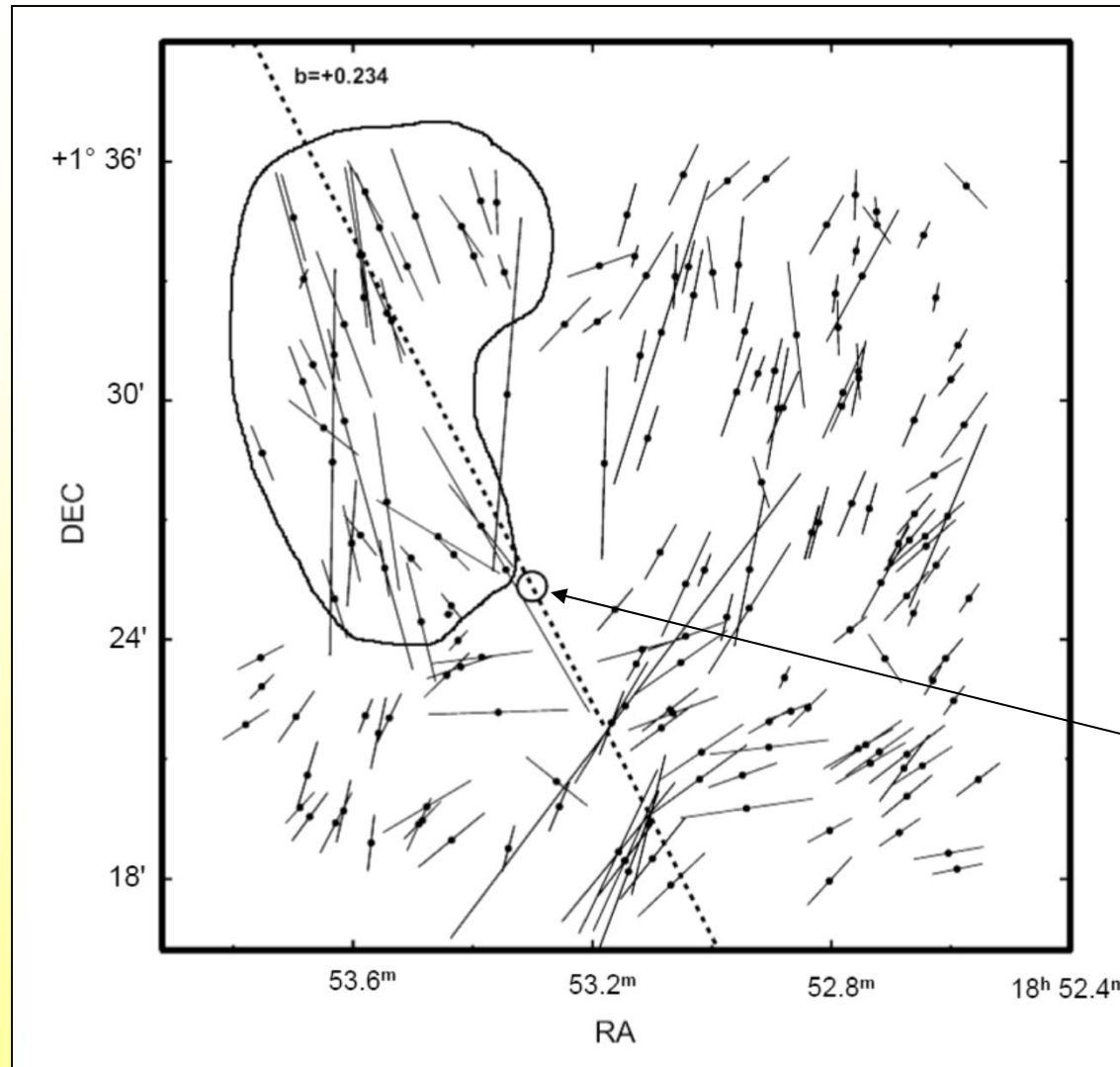


$$\lambda \leq 2a$$



# GPIPS Survey

P in  
Transmission  
at  $1.65 \mu\text{m}$



G034

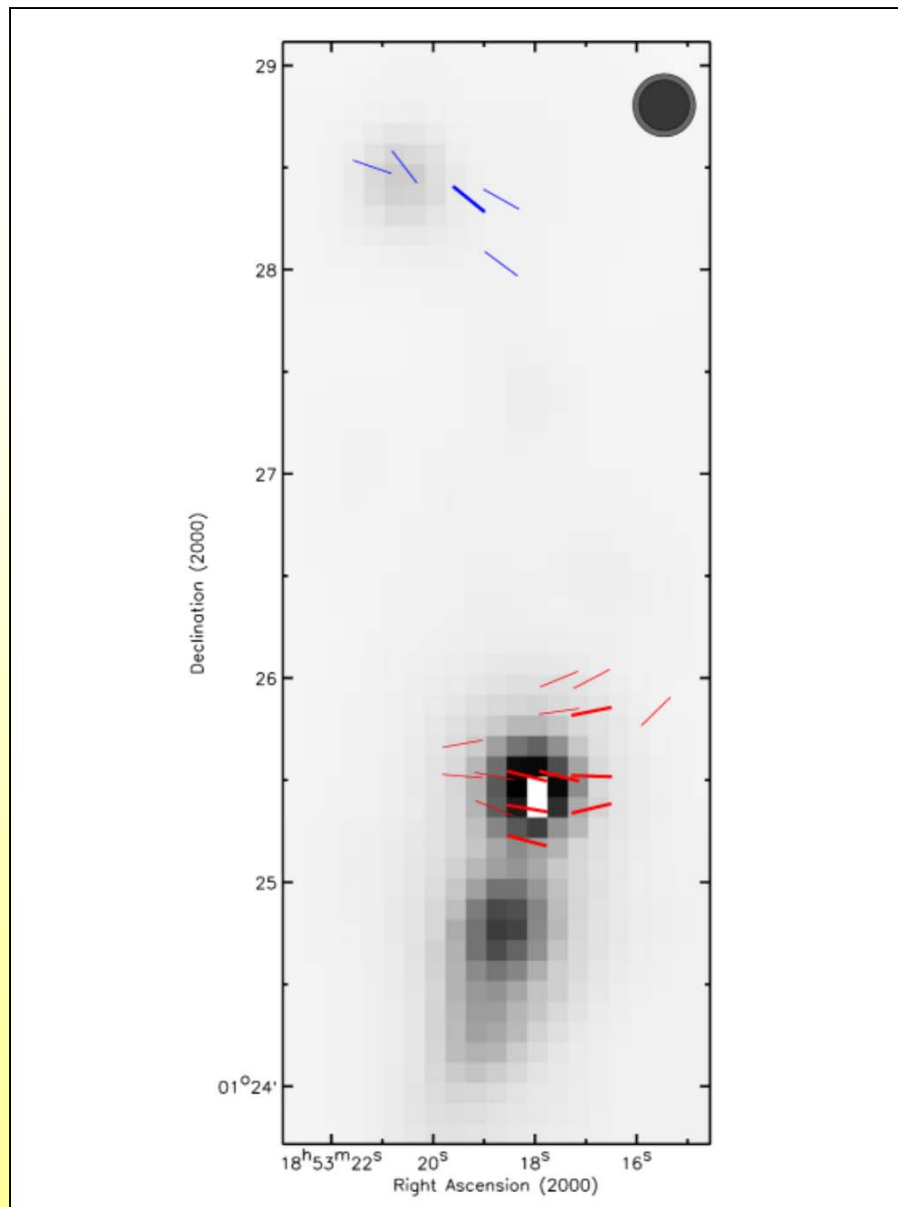
Clemens et al. (2012)

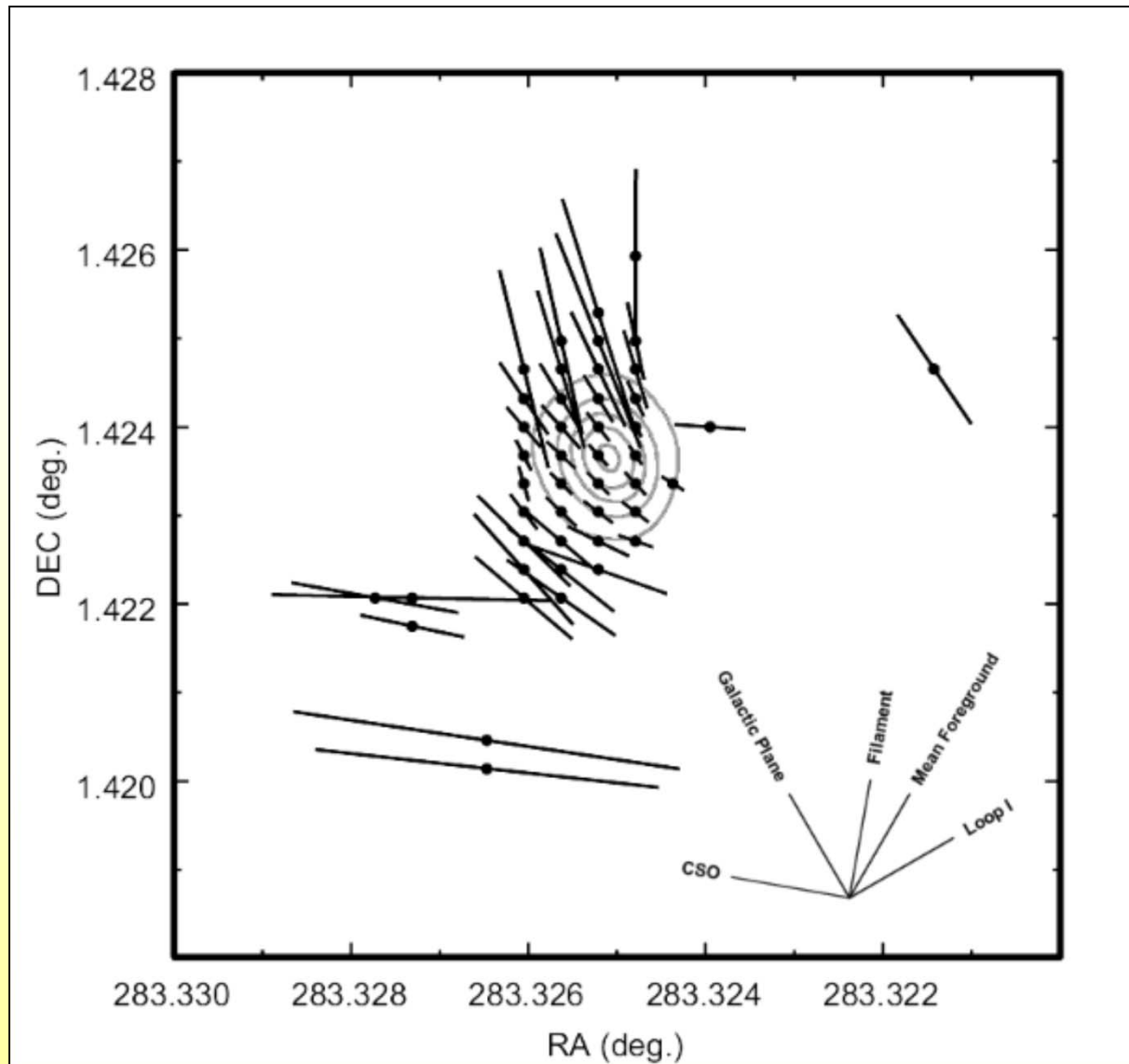


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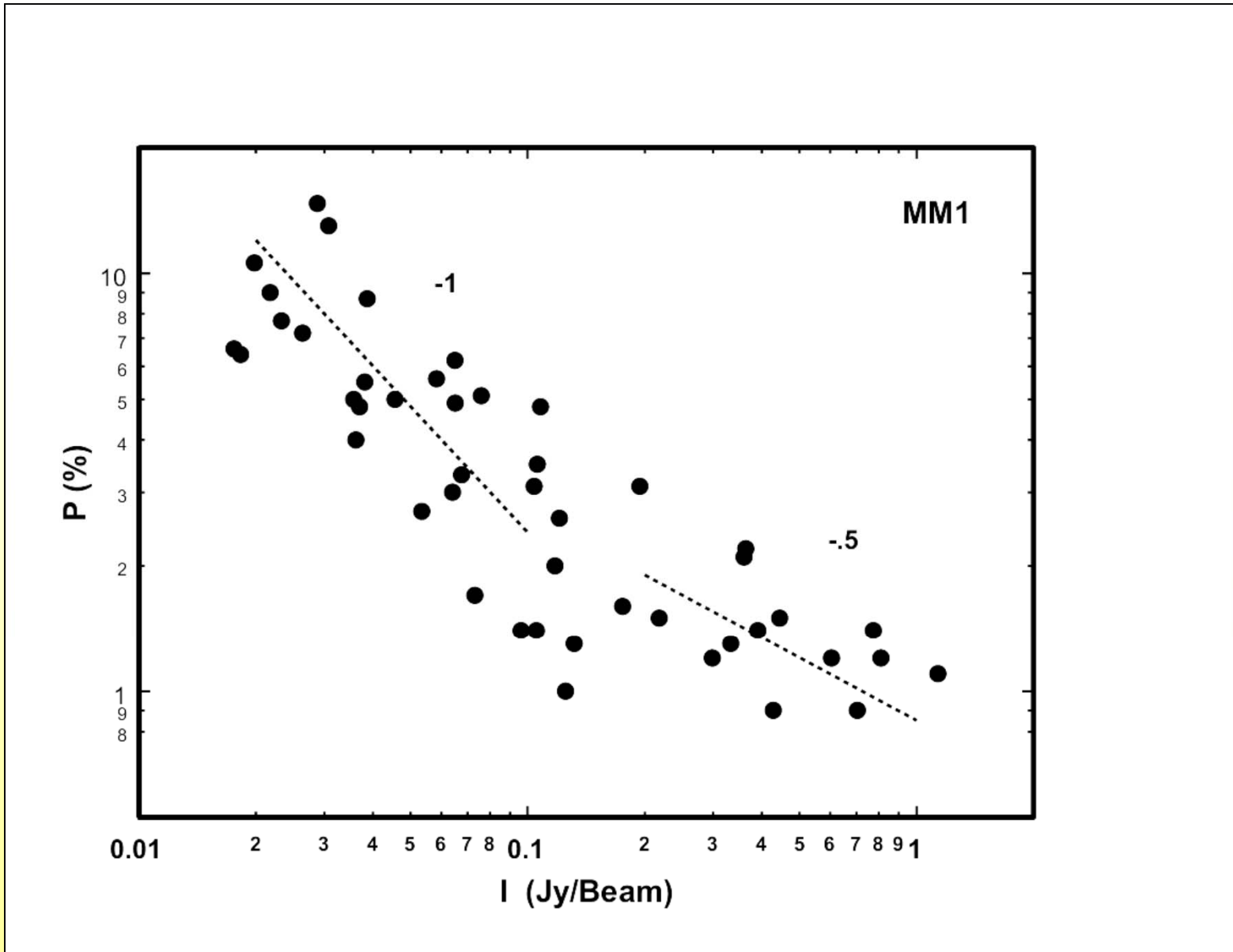
CSO  
470  $\mu\text{m}$

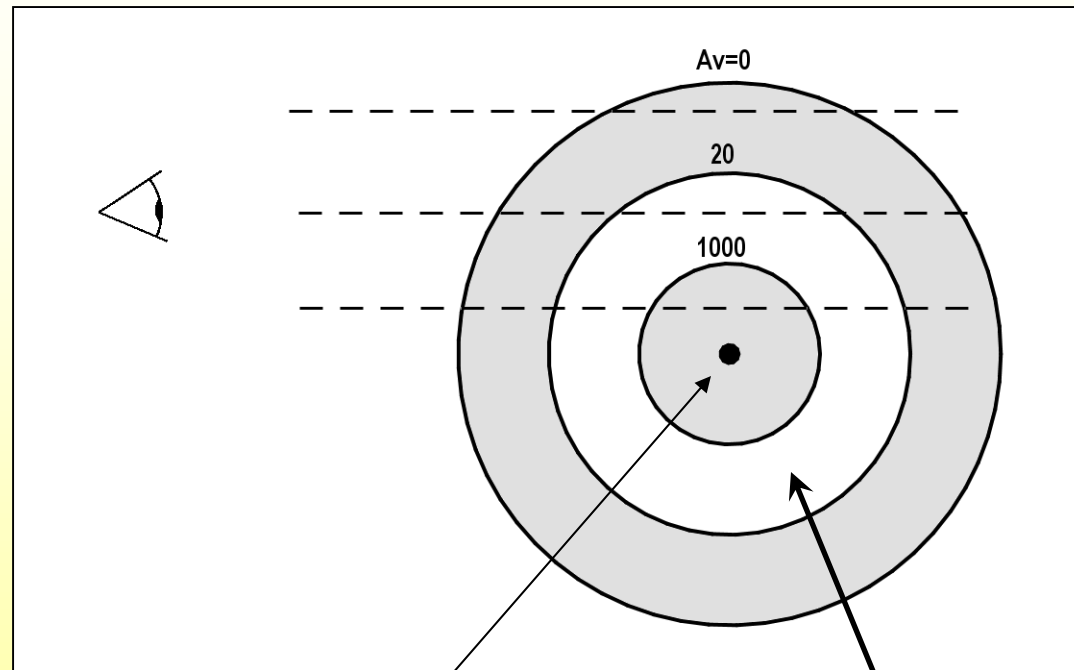




CARMA mm Polarimetry (TADPOL, Hull et al 2014)





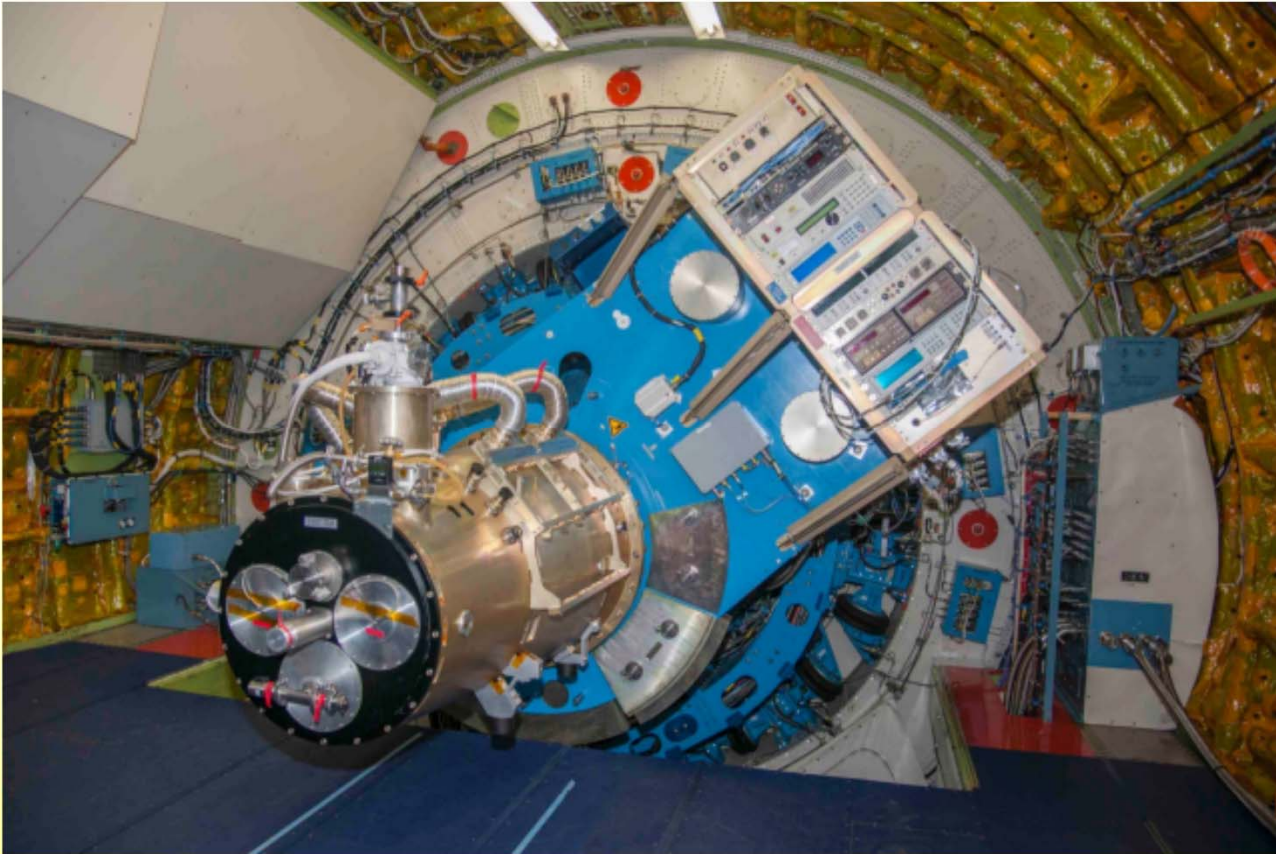


Class 0 YSO

Dead Zone ?



# HAWC+



Goal:  $53\mu\text{m}$  Polarization Map of G034

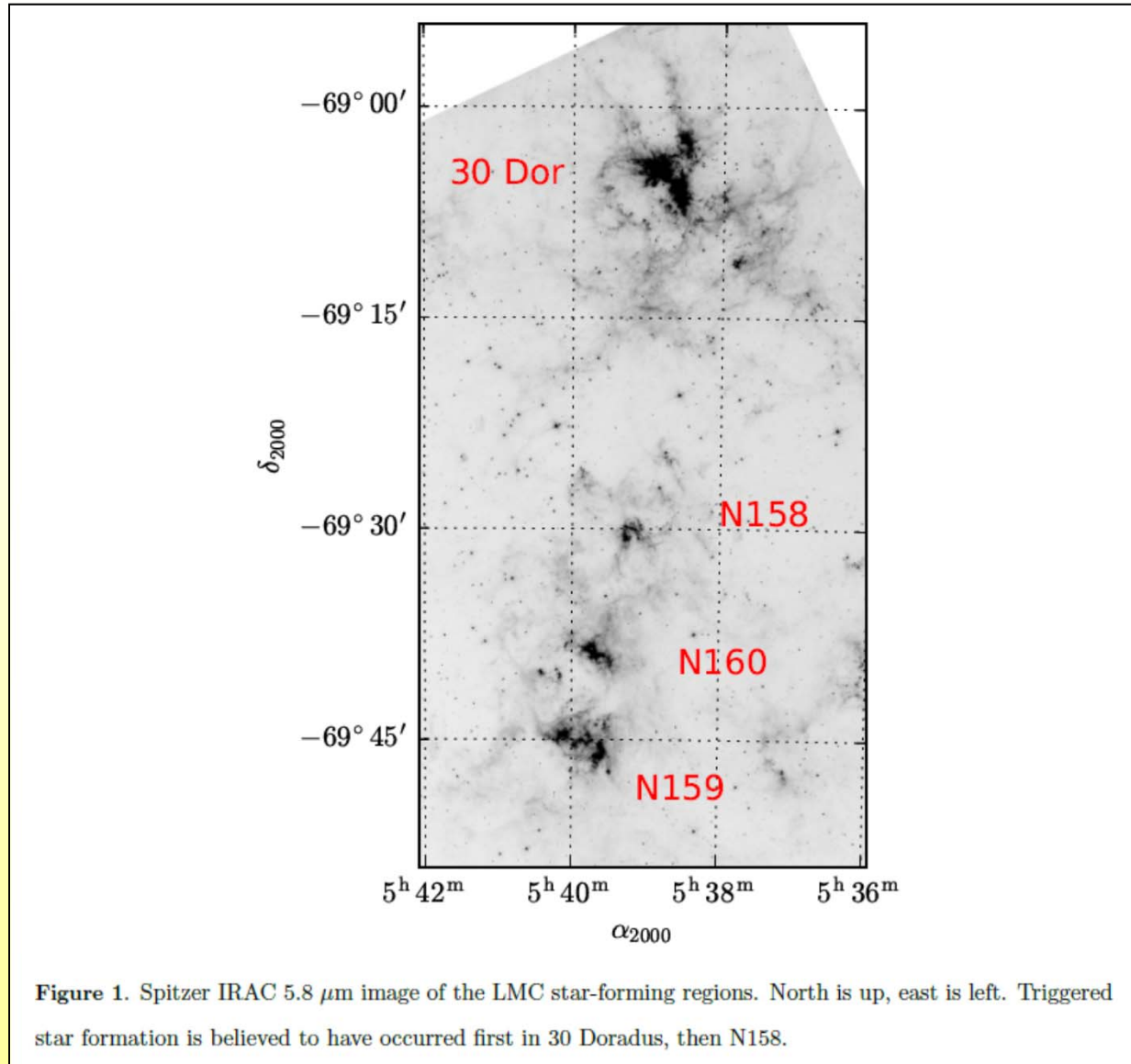


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## Preview of FORCAST Imaging in the LMC



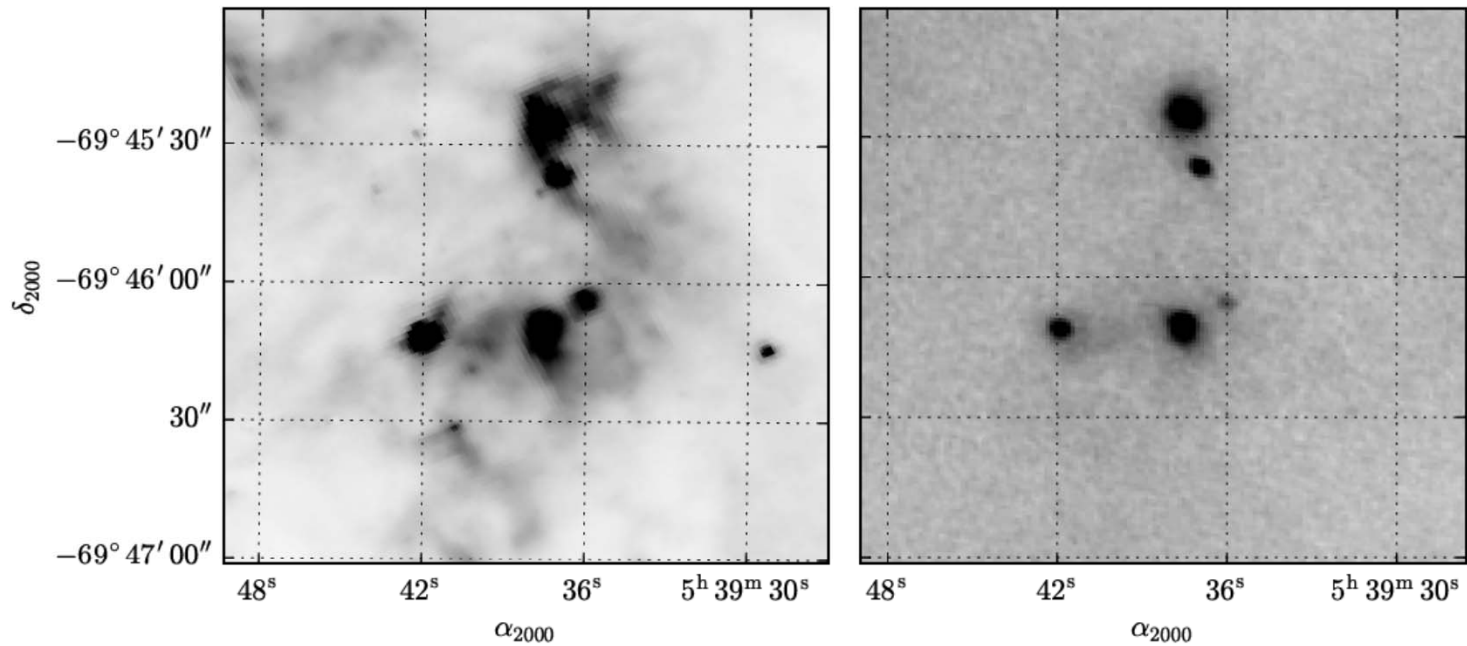
Gordon et al. in referee process



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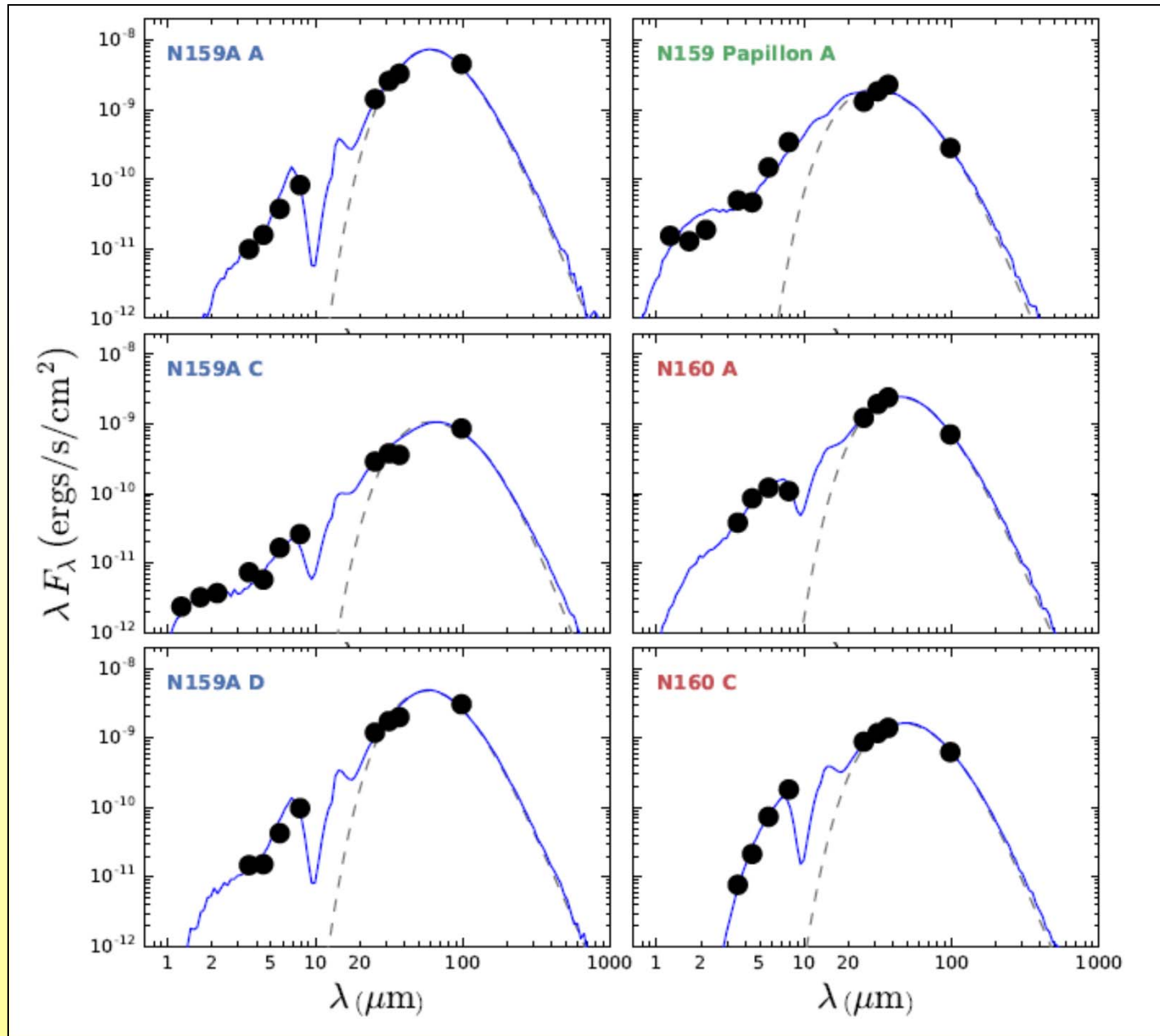
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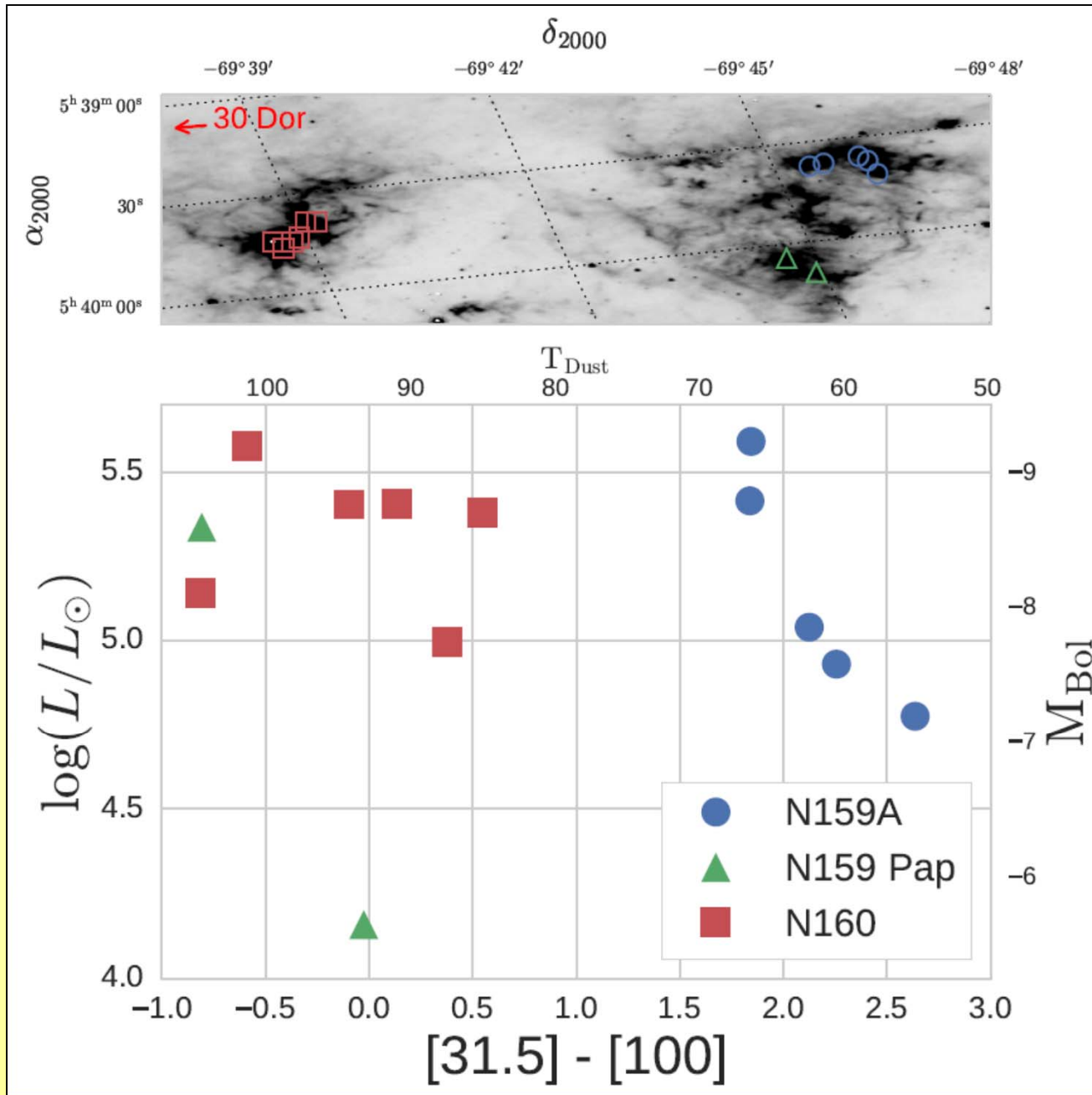
## No evidence for adjacent Class 0 YSOs



**Figure 3.** *Left:* Spitzer IRAC 5.8  $\mu\text{m}$  image of N159A. *Right:* FORCAST 31.5  $\mu\text{m}$  image. Note that the stellar population is somewhat obscured behind diffuse near-IR emission in the Spitzer image.









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