Probing Massive Star Formation at the Earliest Phases with SOFIA

T. J. Jones, Michael Gordon, Dinesh Shenoy, R. D. Gehrz

John E. Vaillancourt

M. Krejny
MM1 in G034.43

8 microns                               25 microns
FORCAST 25 μm

MM1

MM2

MM4
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
Probing the Magnetic Field Geometry Using Polarimetry

Efficient alignment + turbulence

Class 1 YSO

Efficient alignment + turbulence

Alignment up To $A_v \sim 20$

Diffuse ISM

Mol. Cloud

Core

Starless Core
Starless Core, NO Grain Alignment Deep Inside
Radiative Torque Alignment

\[ \lambda \leq 2a \]
GPIPS Survey

P in Transmission at 1.65 μm

Clemens et al. (2012)
CSO
470 μm
CARMA mm Polarimetry (TADPOL, Hull et al 2014)
Class 0 YSO

Dead Zone?
HAWC+

Goal: 53μm Polarization Map of G034
Figure 1. Spitzer IRAC 5.8 μm image of the LMC star-forming regions. North is up, east is left. Triggered star formation is believed to have occurred first in 30 Doradus, then N158.
No evidence for adjacent Class 0 YSOs

Figure 3. *Left:* Spitzer IRAC 5.8 μm image of N159A. *Right:* FORCAST 31.5 μm image. Note that the stellar population is somewhat obscured behind diffuse near-IR emission in the Spitzer image.