Dust Polarization in the Infrared Dark Cloud G34.43

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Herschel reveals a “universal” filamentary structure in the cold ISM.
IRDC G34.43

• Distance: 3.7 kpc

• Star formation rate is ~ 7% (Shepherd+2007)

• Distributed population of low mass protostars within the filament. Highest mass protostars form in the most bound portion of the filament. (Foster+2014)
the B field at intermediate scale is missing!

SHARP on CSO at 350 μm, 12" (0.25 pc)

Hull+2014

Zhang+2014
B field

Tang, in prep.
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the B field orientations remain the same from 10 pc scale down to 0.1 pc scale in G34.43

Is this a special case?
Color lines: CO outflow  Zapata+2009
Background: H$_2$ jet
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Is this a special case?
In the case of OMC1 and W51e2/W51 North, the B field orientations change dramatically at various scales.

Tang, in prep.
On the fragmentation
Comparison with Serpens
what governs the fragmentation process? Can it be turbulence?
the mm1 core is more quiescent
Summary

- The B field sampled with SHARP on CSO is crucial, as it provides the information at intermediate scale between PLANCK/BLASTPOL and ALMA/SMA/CARMA.

- B field orientations remain the same from 10 pc scale down to 0.1 pc scale in G34.43.

  - In the case of OMC1 and W51e2/W51 North, the B field orientations change dramatically at smaller scales, most likely due to stellar feedback or infall of gas toward the protostar.

- Fragmentation within the dense cores are dramatically different, ranging from remains single to cluster?

  - What governs the fragmentation process?