Constraining Dust Structure in Three Protoplanetary and Transitional Disks

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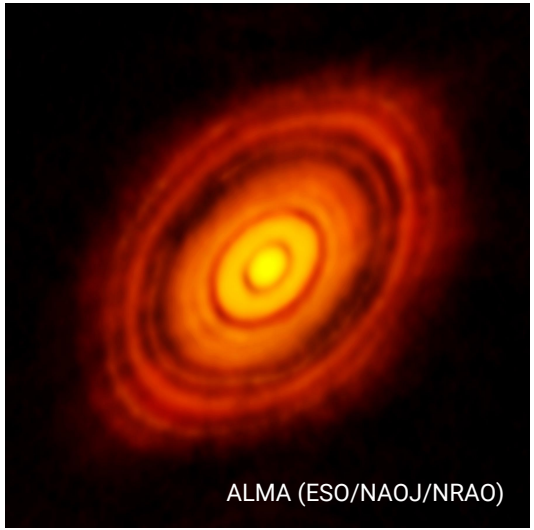
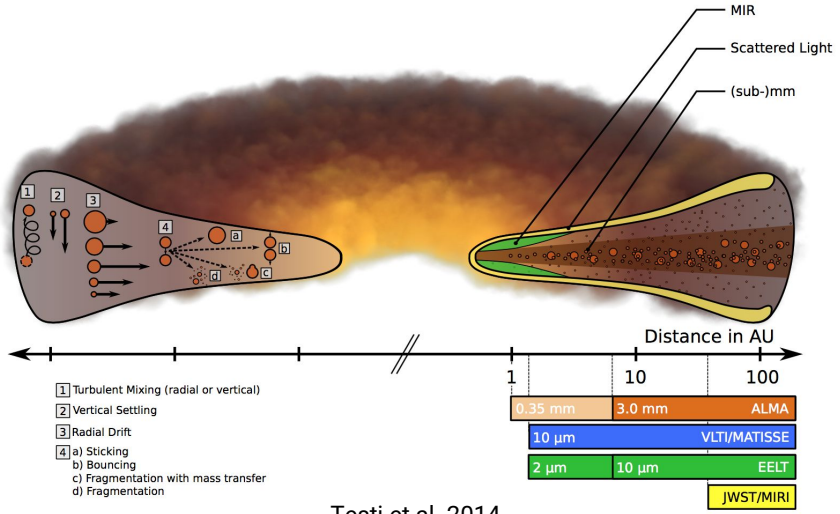
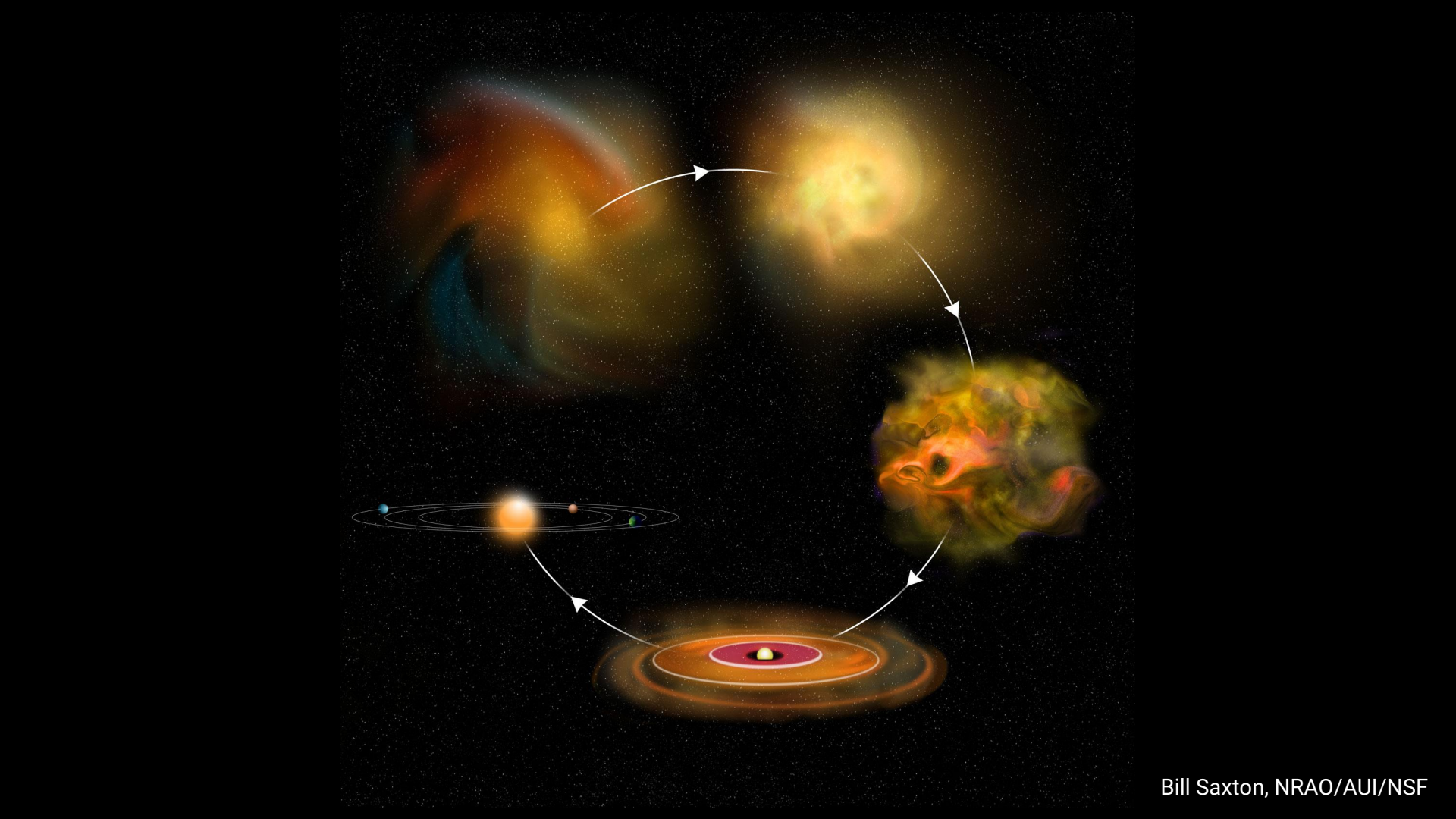
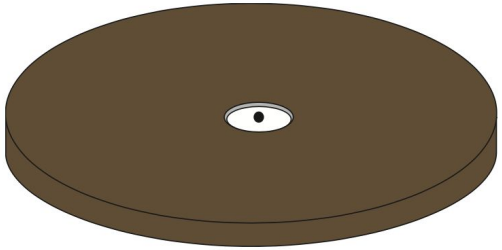




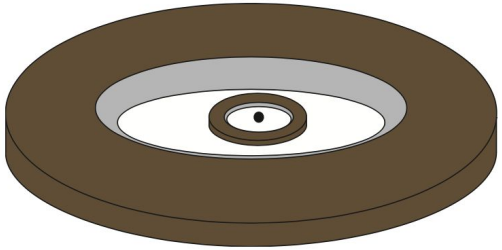
Testi et al. 2014



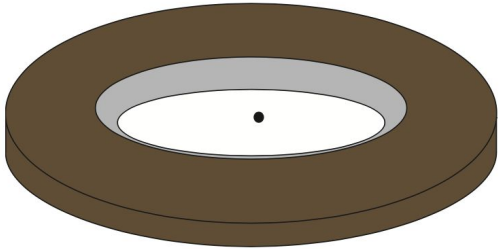
Bill Saxton, NRAO/AUI/NSF



Full Disk



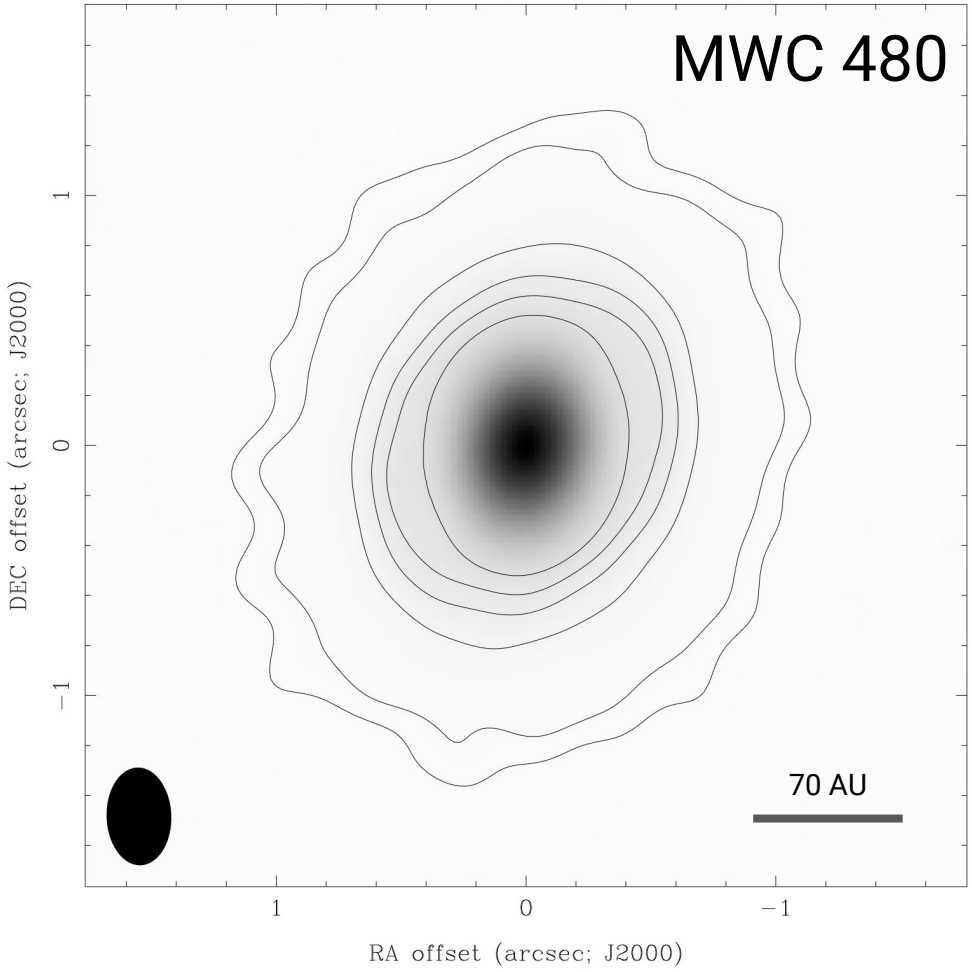
Pre-Transitional Disk

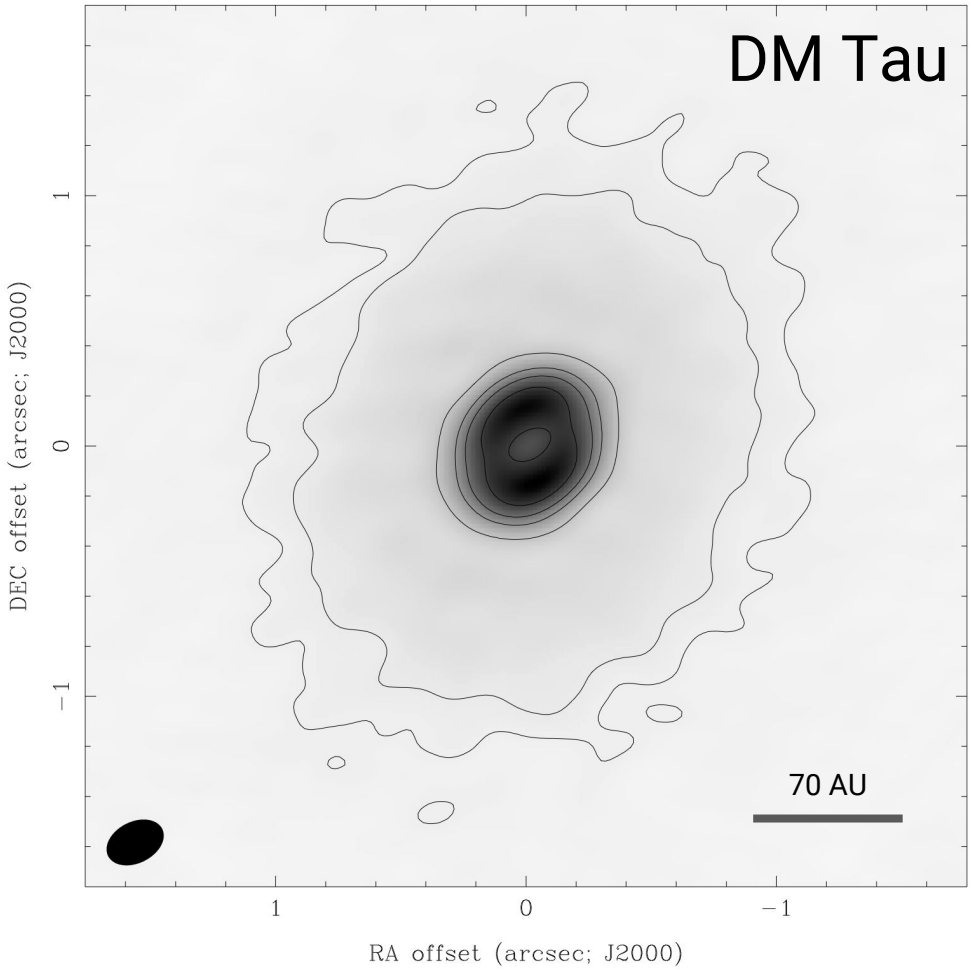


Transitional Disk

Figure from Espaillat et. al. 2014


The
Atacama
Large
Millimeter/submillimeter
Array
Carlos Padilla – ALMA (ESO/NAOJ/NRAO)


MWC 480
70 AU
DEC offset (arcsec; J2000)
RA offset (arcsec; J2000)
1
0
−1
1
0
−1


DM Tau
70 AU
DEC offset (arcsec; J2000)
RA offset (arcsec; J2000)
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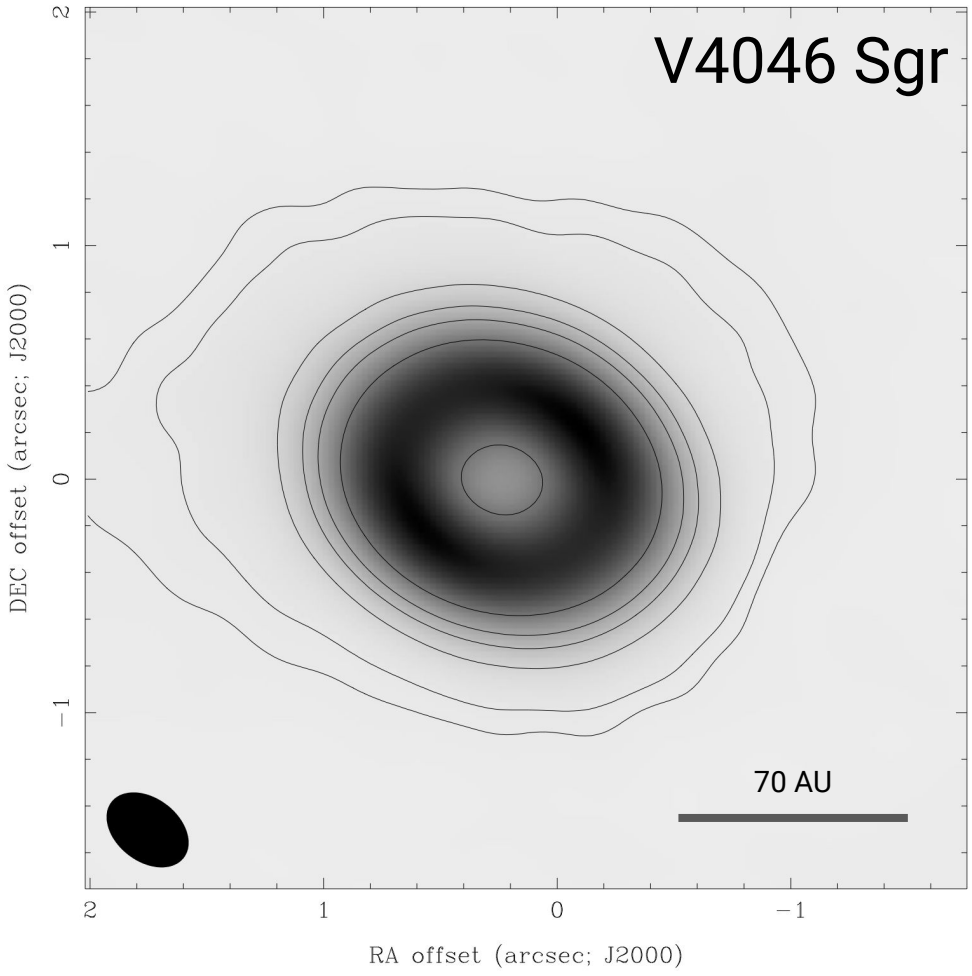
0
−1
1
0
−1


V4046 Sgr
70 AU
DEC offset (arcsec; J2000)
RA offset (arcsec; J2000)
2
1
0
−1

MWC 480

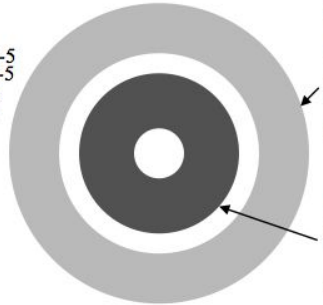
1 ring

dust-to-gas: $0.0147^{+3.2e-5}_{-3.1e-5}$

inner radius: $9.25^{+0.0074}_{-0.0008}$

outer radius: $84^{+0.02}_{-0.2}$

DM Tau



2 rings

dust-to-gas: $0.0048^{+4.2e-5}_{-5.6e-5}$

inner radius: $73.06^{+0.10}_{-0.47}$

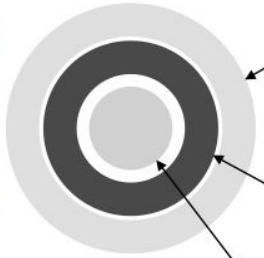
outer radius: $194.36^{+0.41}_{-0.07}$

dust-to-gas: $0.0066^{+1.0e-5}_{-2.3e-5}$

inner radius: $18.92^{+0.07}_{-0.006}$

outer radius: $46.58^{+0.08}_{-0.009}$

V4046 Sgr



3 rings

dust-to-gas: $8.8e\text{-}5^{+1.5e-5}_{-1.1e-5}$

inner radius: $73.45^{+3.48}_{-0.75}$

outer radius: $90.58^{+0.94}_{-1.19}$

dust-to-gas: $0.01^{+1.1e-4}_{-6.0e-5}$

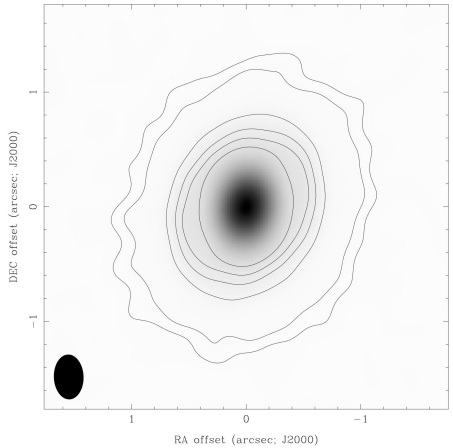
inner radius: $24.74^{+0.12}_{-0.17}$

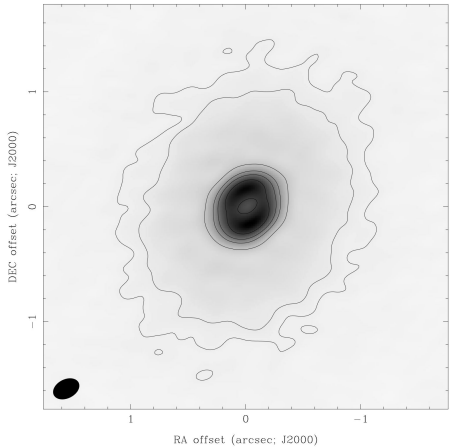
outer radius: $62.01^{+0.11}_{-0.24}$

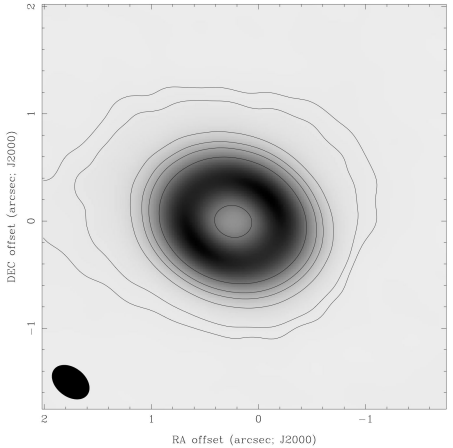
dust-to-gas: $9.5e\text{-}4^{+1.35e-4}_{-6.7e-5}$

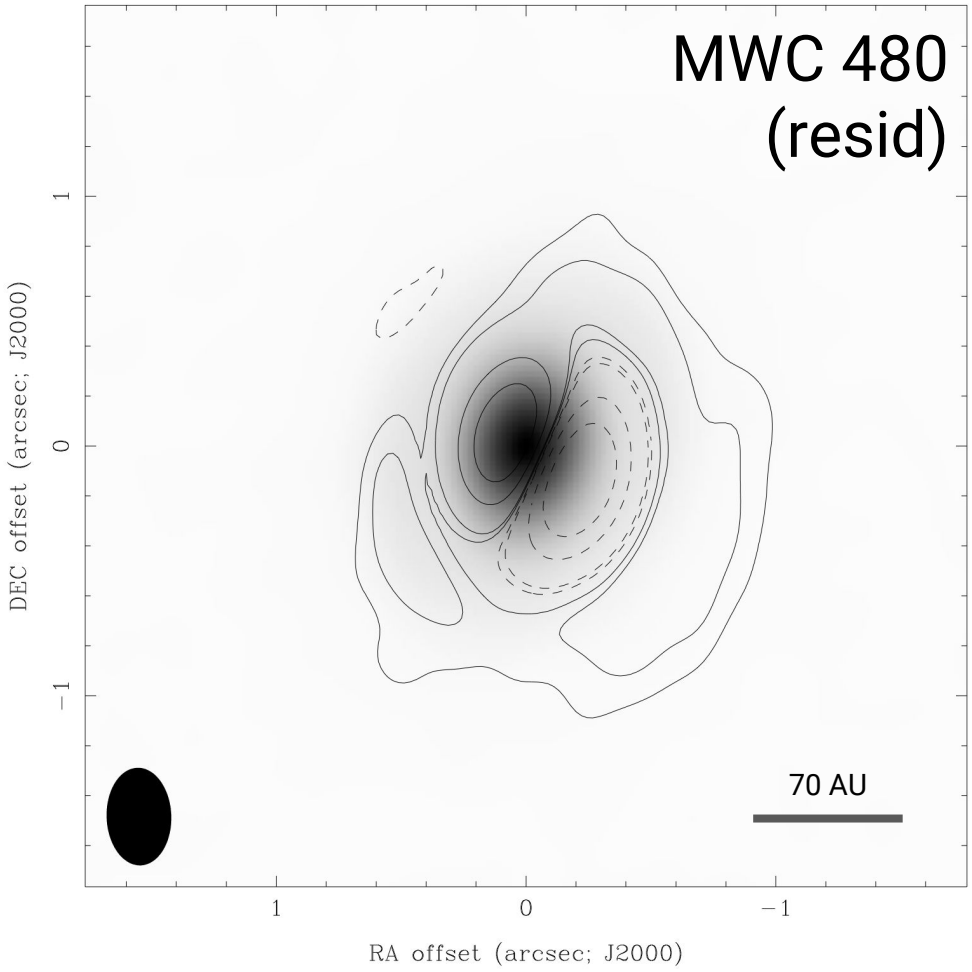
inner radius: $1.5e\text{-}4^{+1.64e-4}_{-2.3e-4}$

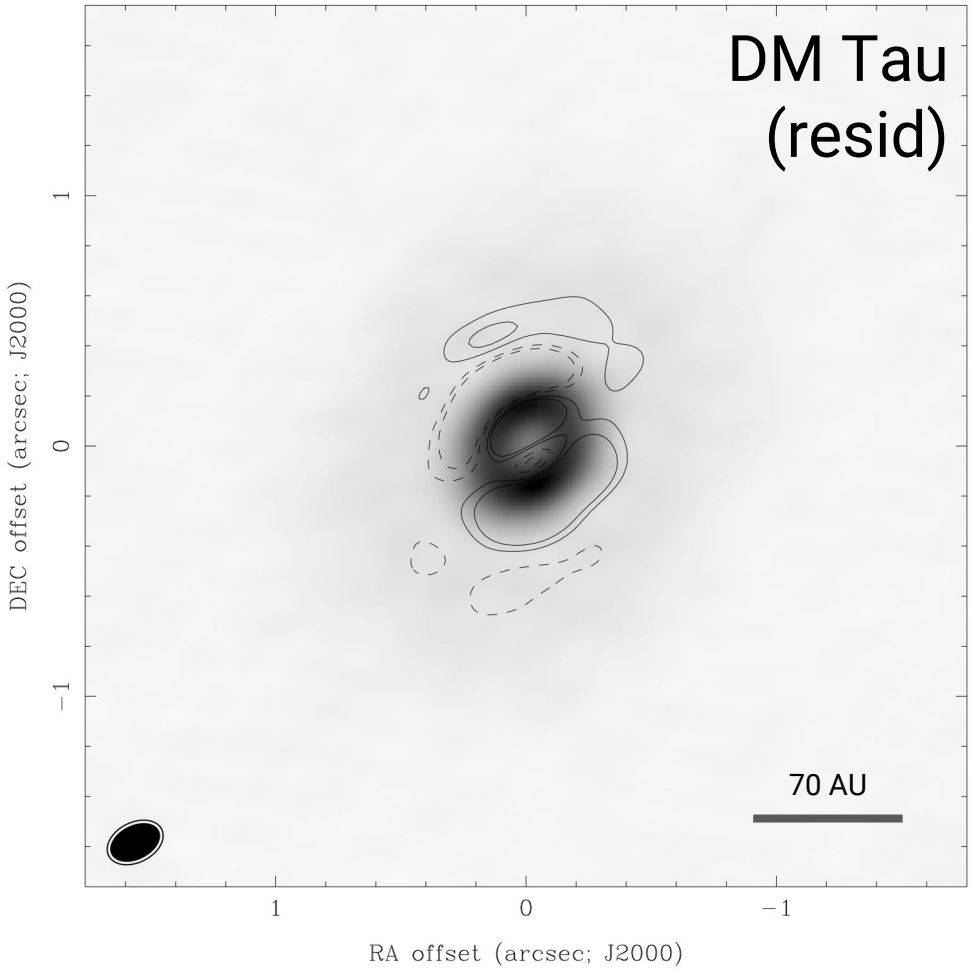
outer radius: $14.90^{+1.19}_{-0.802}$

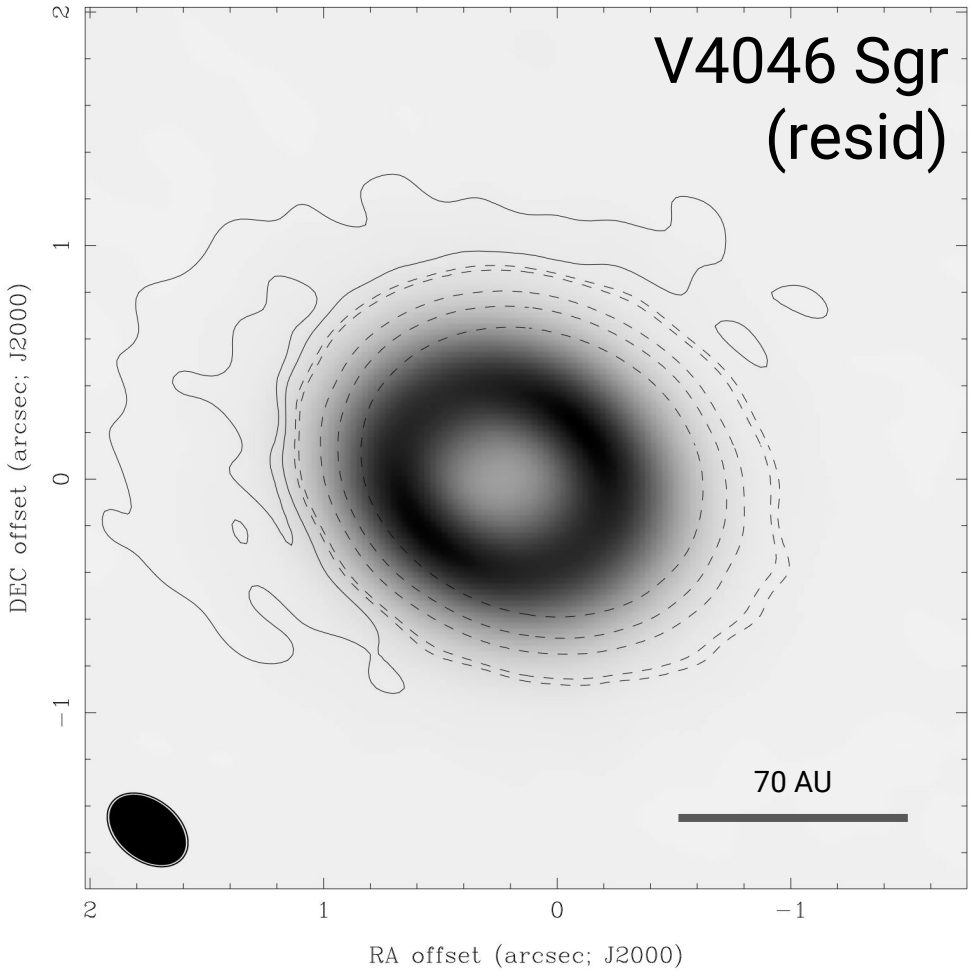







MWC 480
(resid)
70 AU
DEC offset (arcsec; J2000)
RA offset (arcsec; J2000)
1
0
−1
1
0
−1


DM Tau
(resid)
70 AU
DEC offset (arcsec; J2000)
RA offset (arcsec; J2000)
1
0
−1
1
0
−1


V4046 Sgr
(resid)
70 AU
DEC offset (arcsec; J2000)
RA offset (arcsec; J2000)
2
1
0
−1

Our models suggest that MWC 480, DM Tau, and V4046 Sgr might host asymmetric disks.

We can still make conclusions about mechanisms at work within the disks!

Acknowledgements

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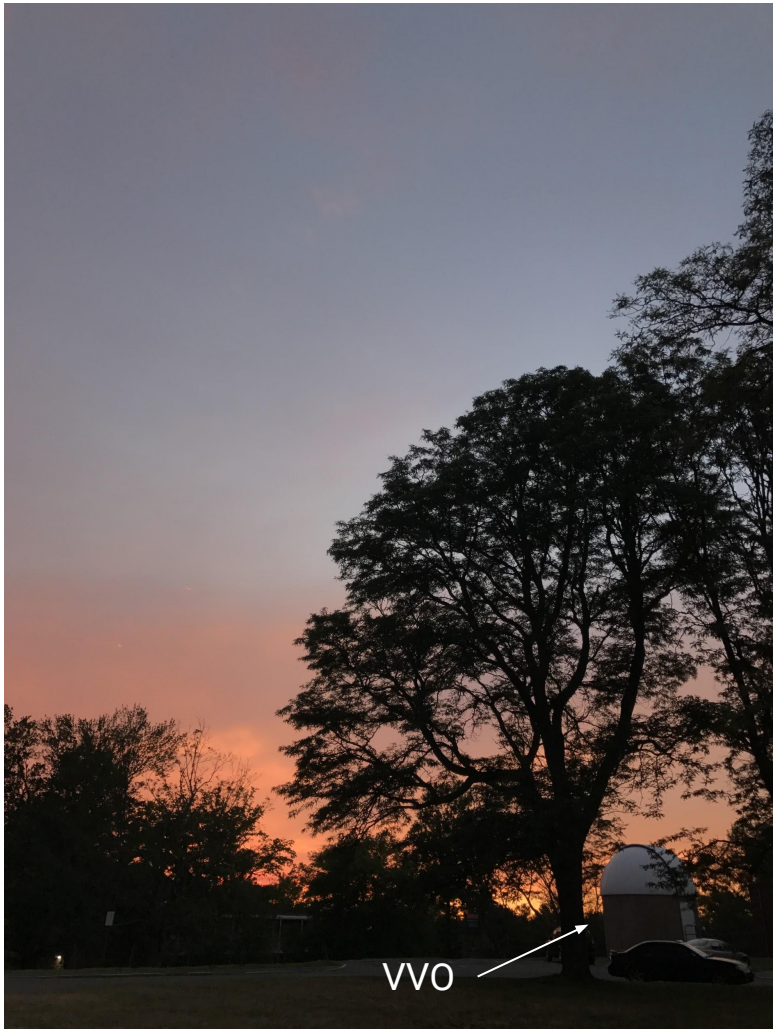
— Dr. John Cannon (of Macalester College)



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Images
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2. Star formation: https://www.nrao.edu/pr/2012/clumpcores/
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