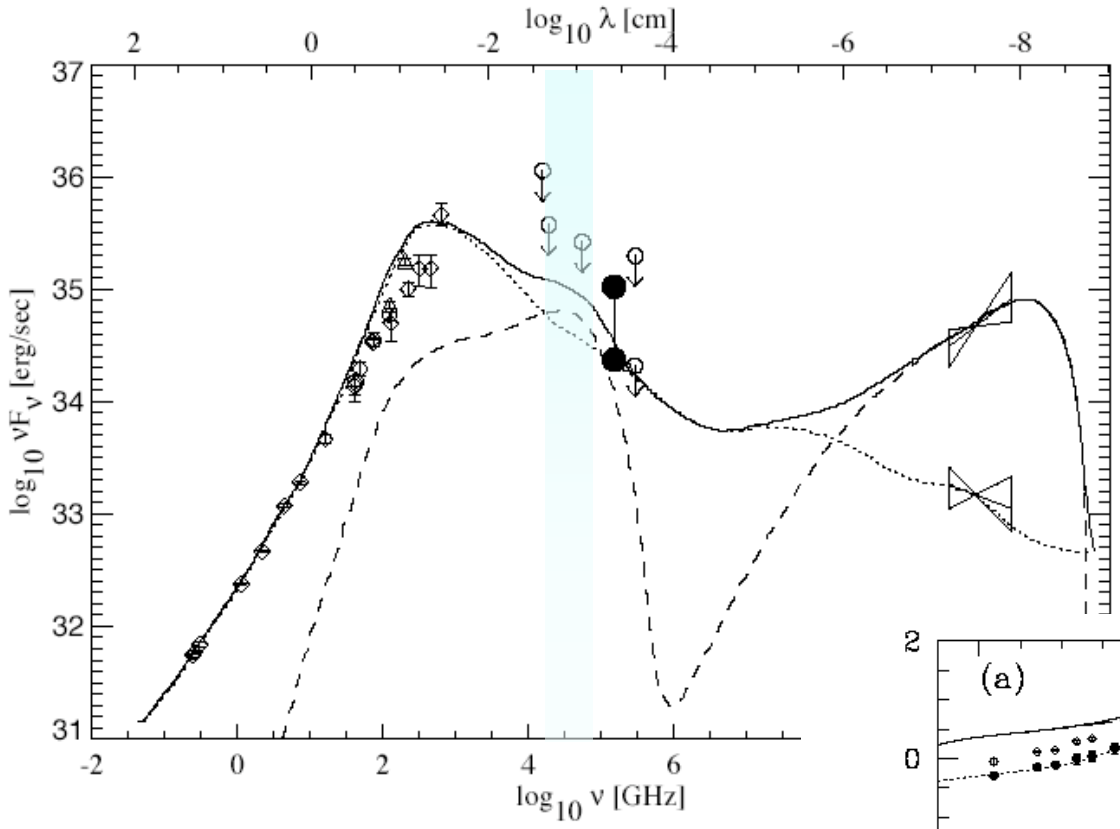
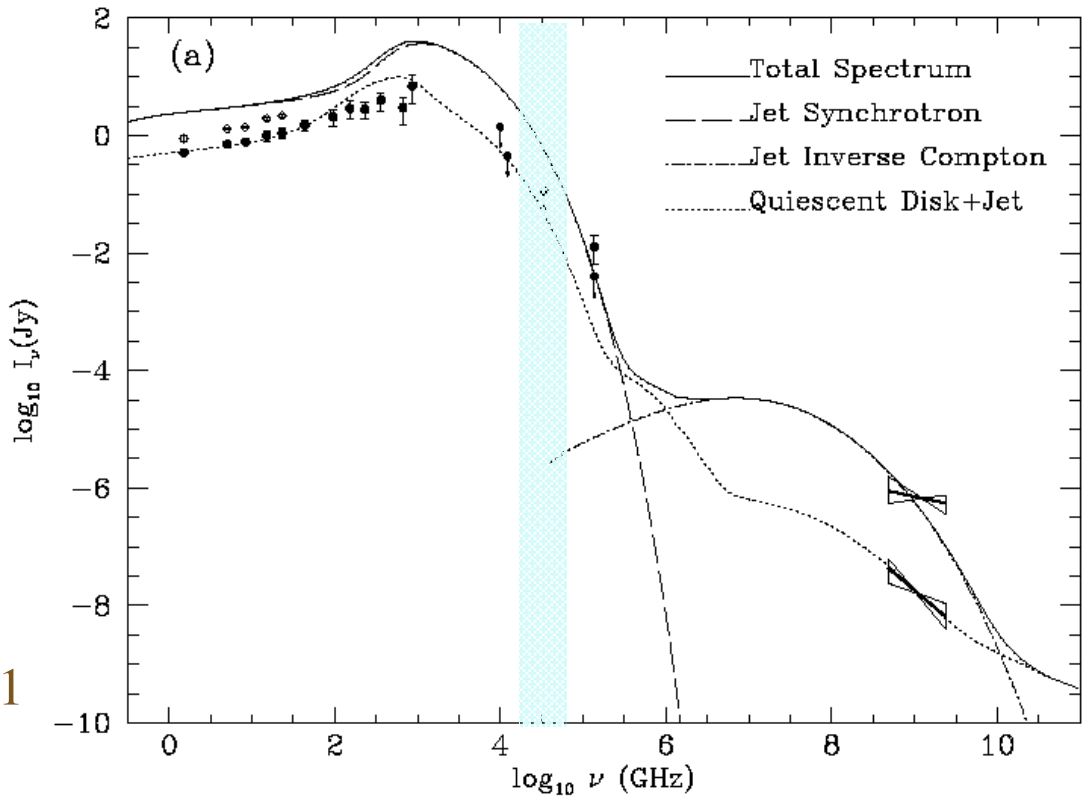
SgrA* in the Mid-IR

Mark Morris, Andrea Ghez, Eric Becklin,
Angelle Tanner
UCLA

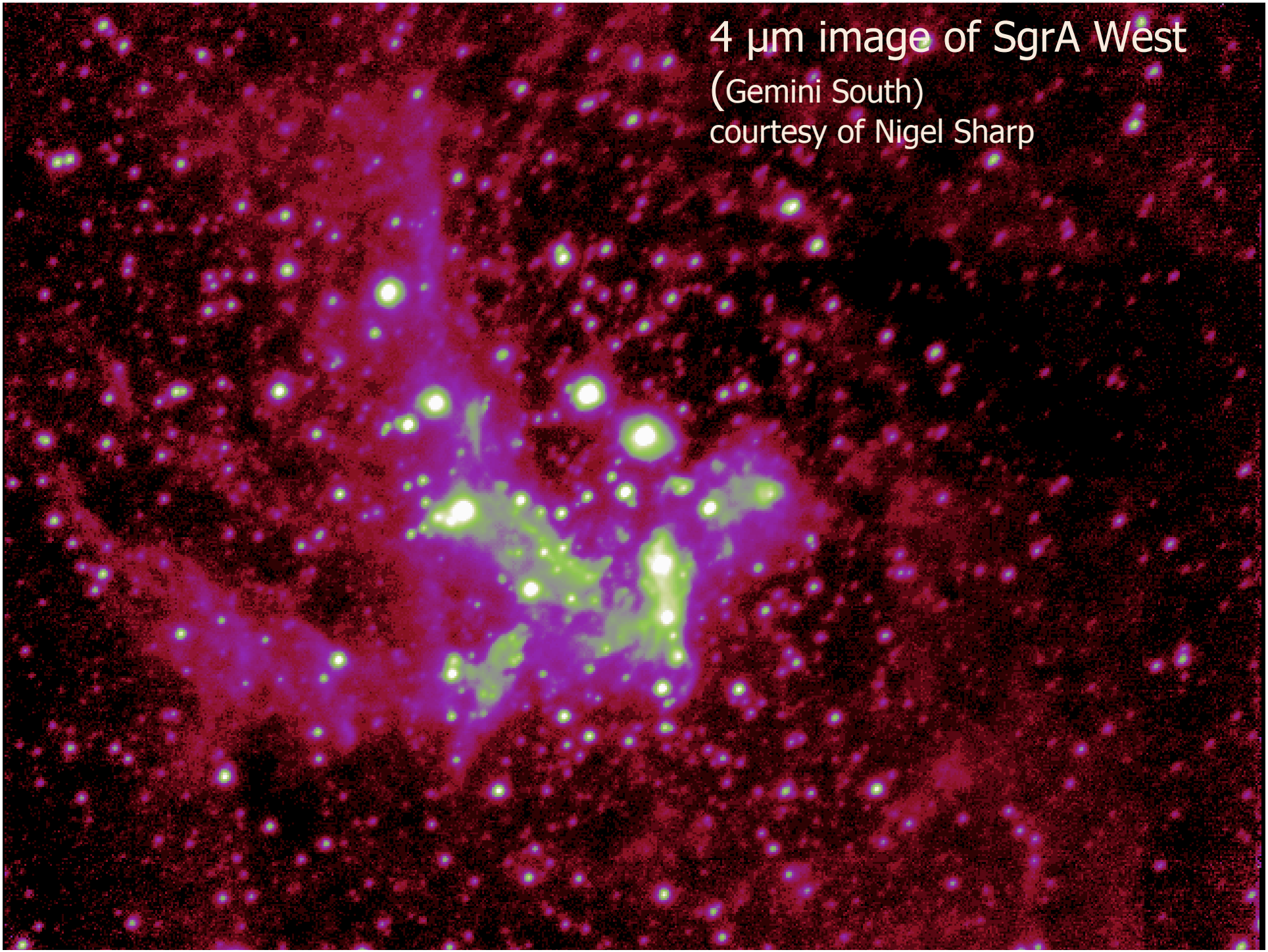


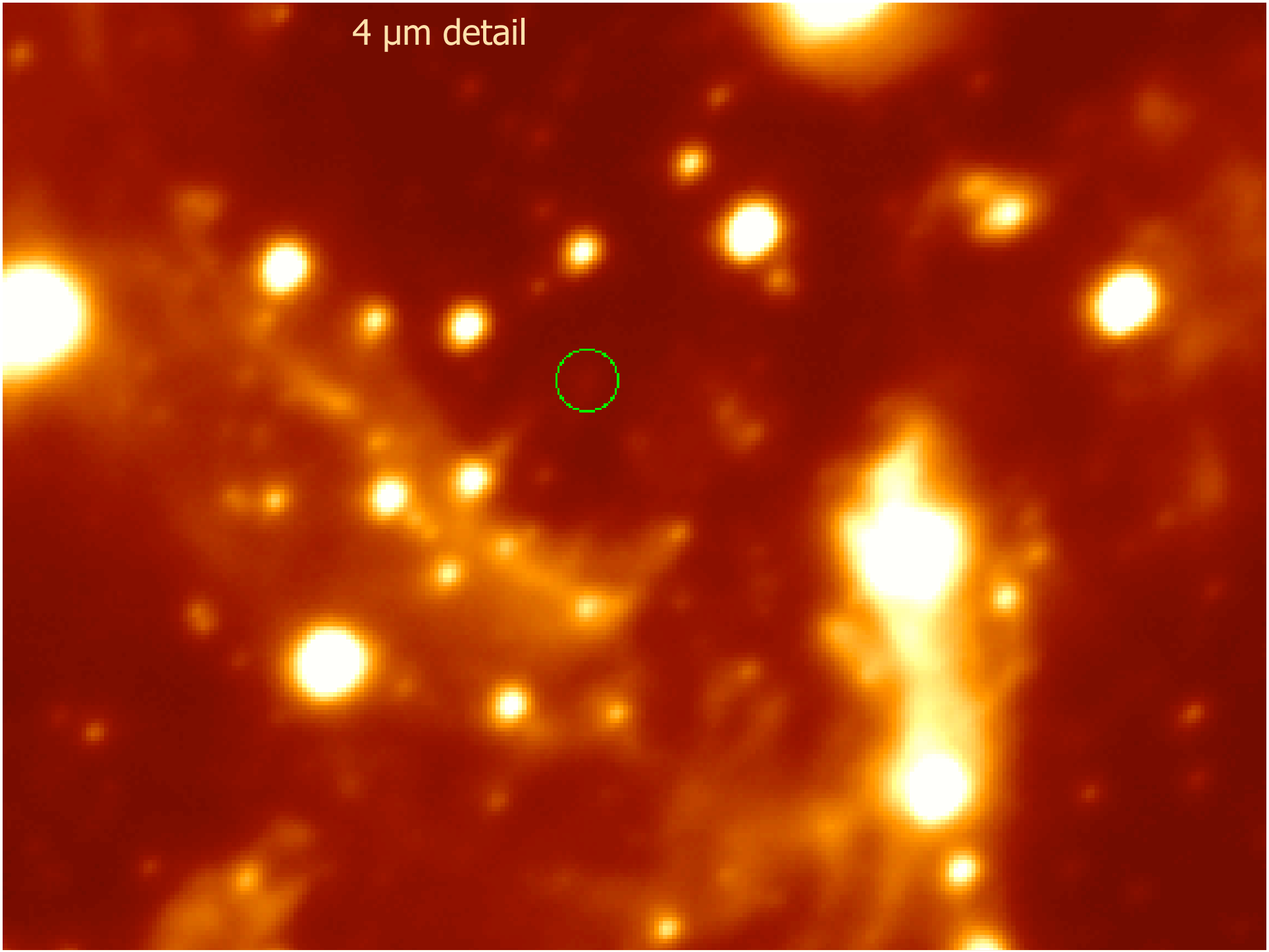
Yuan et al. 2003

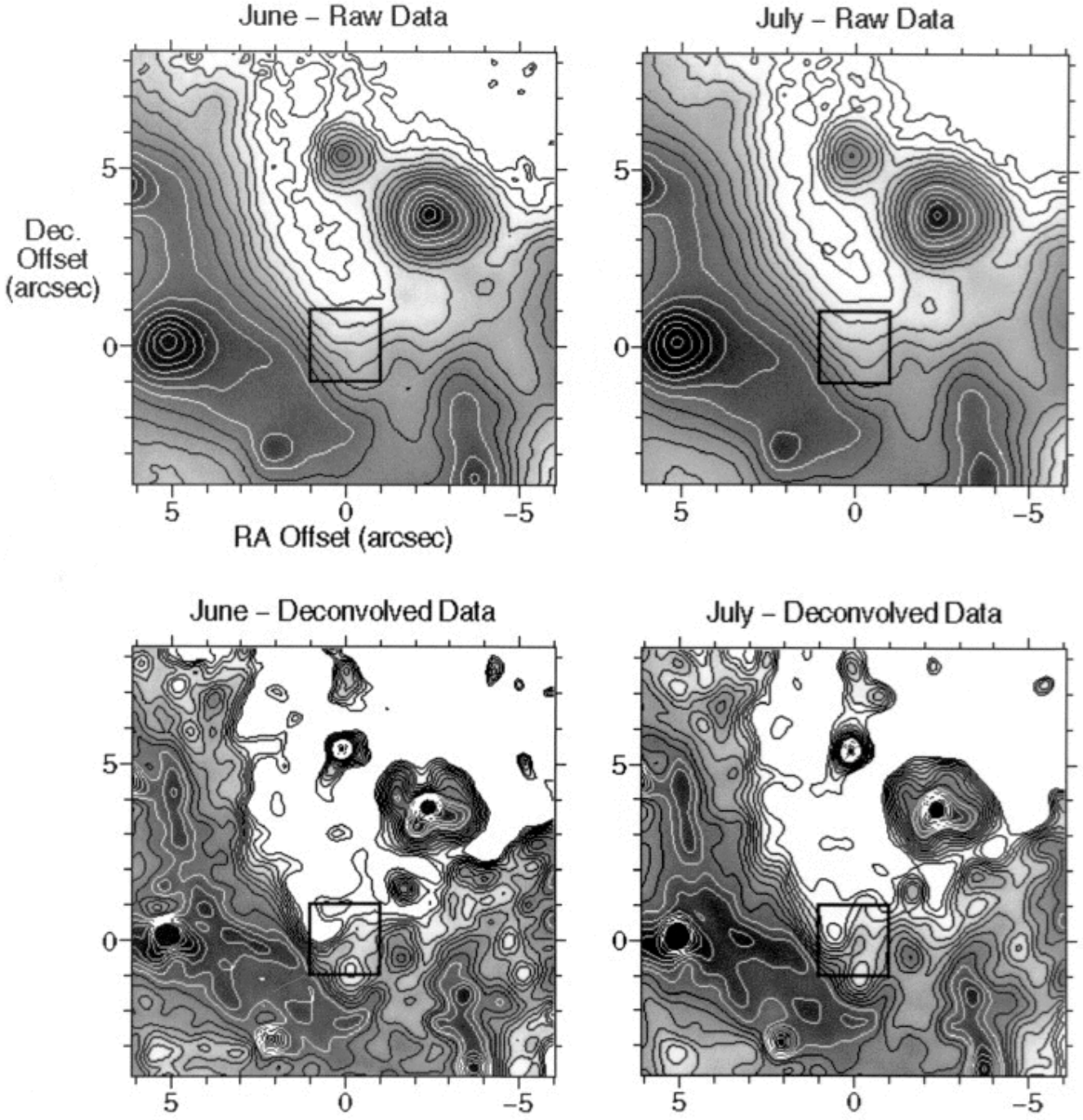
Motivation



Markoff et al. 2001

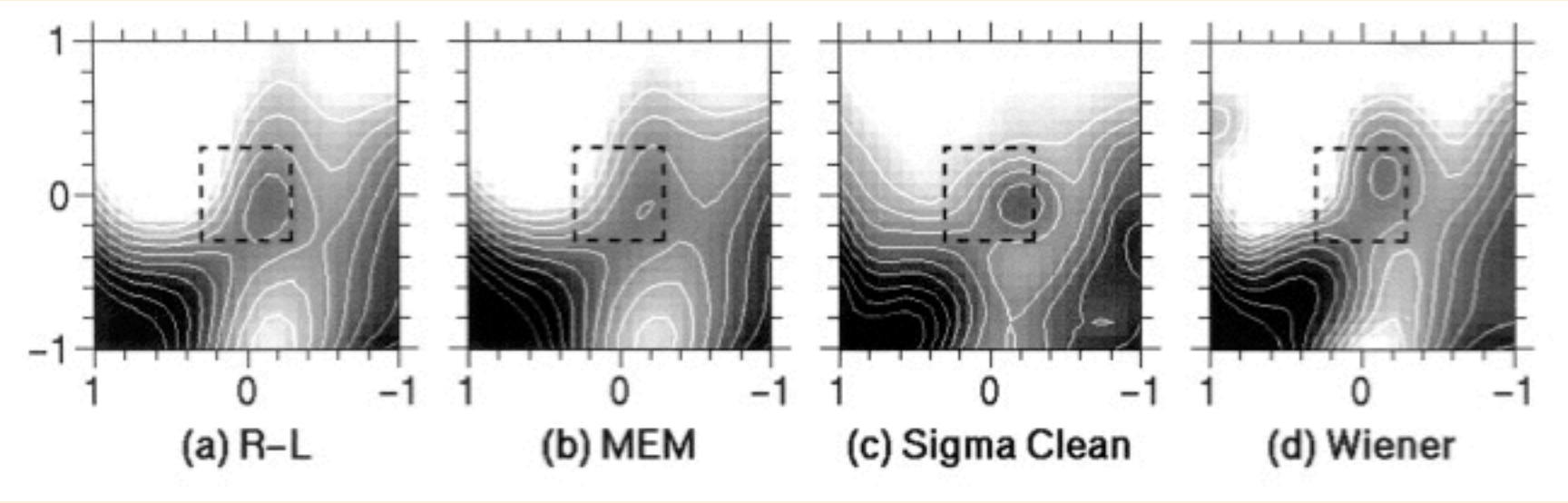

4 μm image of SgrA West
(Gemini South)
courtesy of Nigel Sharp


4 µm detail

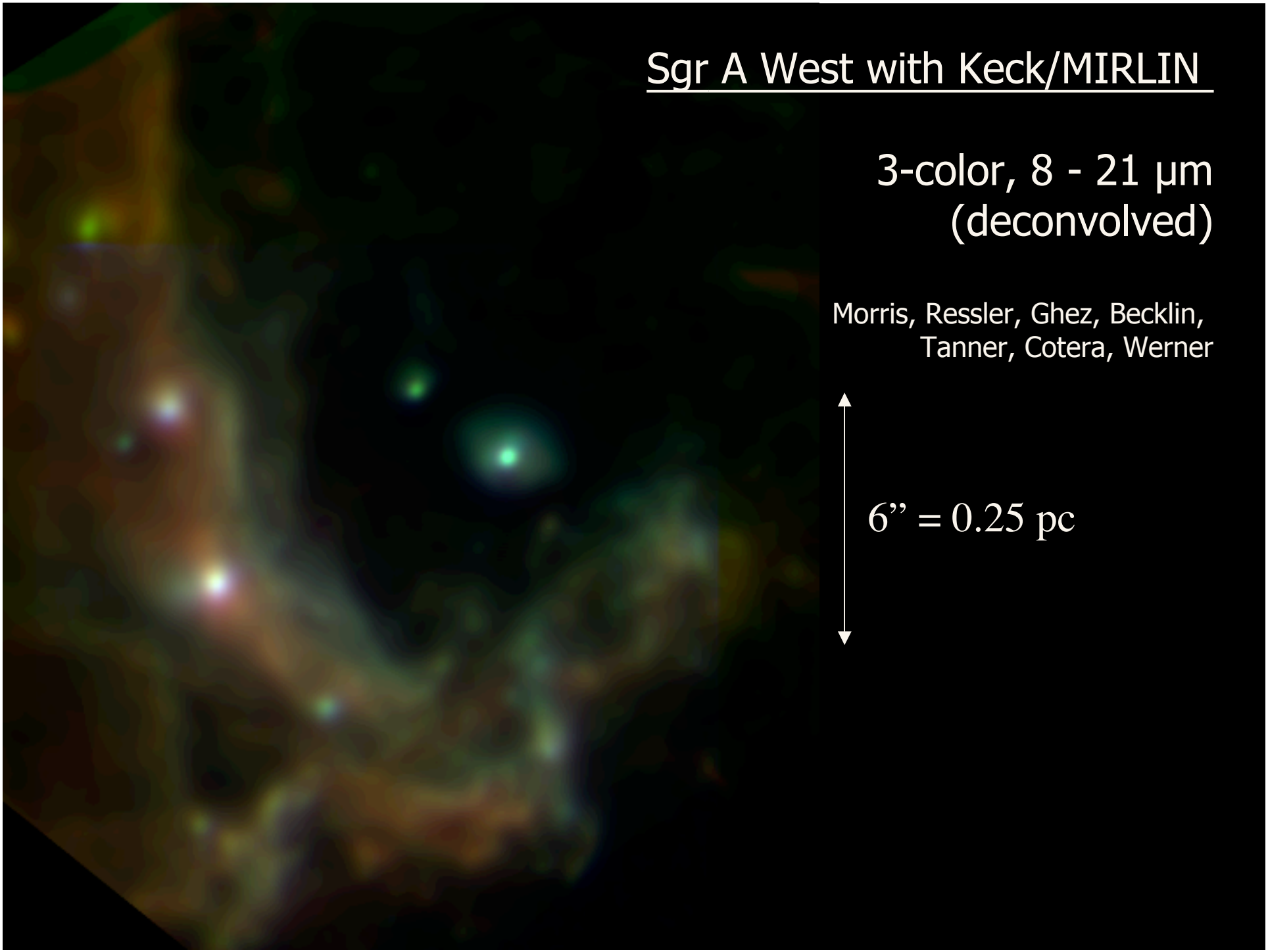


Stolovy, Hayward, & Herter 1996

Stolovy et al. 1996, continued



8.7 μm Flux limit: 25 mJy


Sgr A West with Keck/MIRLIN
3-color, 8 - 21 μm
(deconvolved)
Morris, Ressler, Ghez, Becklin,
Tanner, Cotera, Werner
6” = 0.25 pc

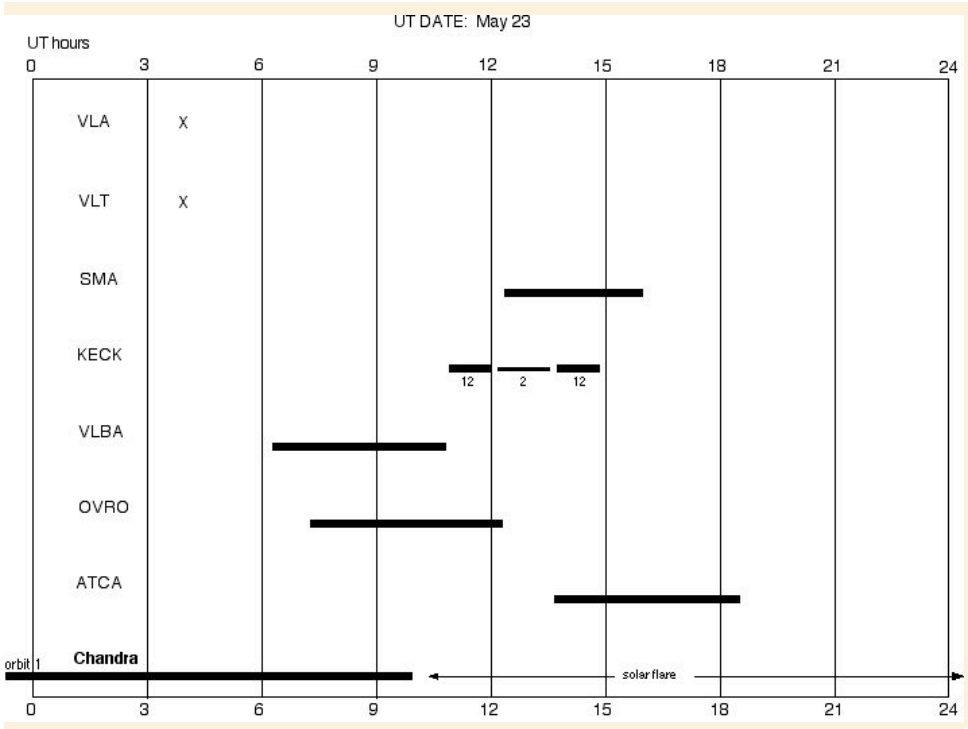
Observations with Keck/LWS:

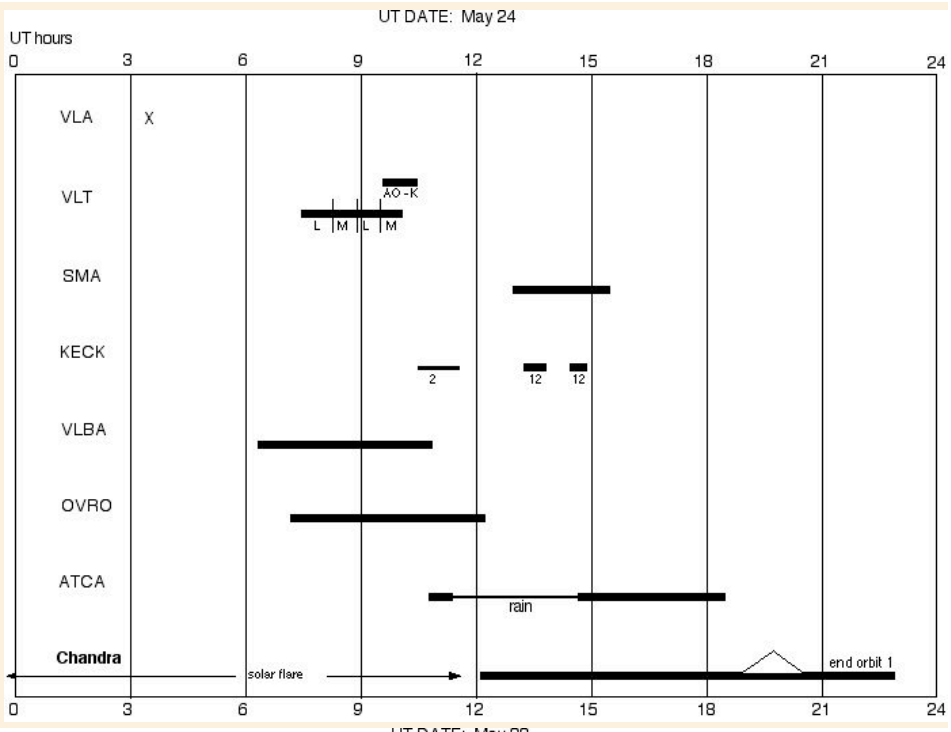
Part of campaign to observe simultaneously with Chandra in May 2002

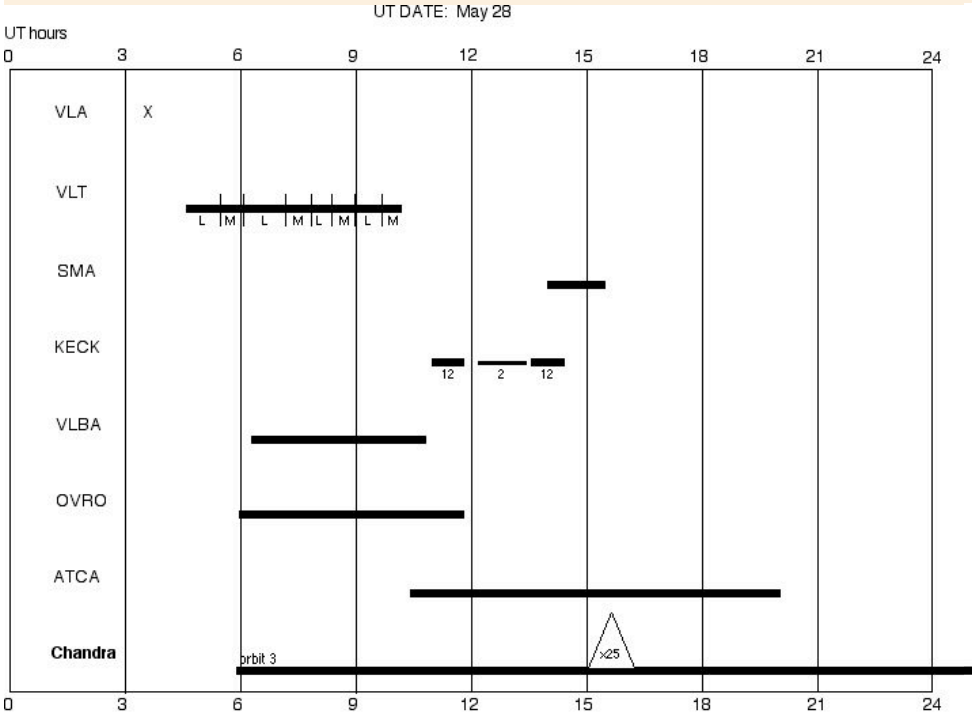
Keck: alternating between near-IR and mid-IR on 4 nights

Instrument: LWS, using wide SiC filter, centered at about 11 μm

Observing near the diffraction limit (~0.3") with 0.08" pixels


UT DATE: May 23
UT hours
0 3 6 9 12 15 18 21 24
VLA X
VLT X
SMA
KECK
12 2 12
VLBA
OVRO
ATCA
Chandra
orbit 1
solar flare


UT DATE: May 24
UT hours
0 3 6 9 12 15 18 21 24
VLA X
VLT
AO-K
L M L M
SMA
KECK
2 12 12
VLBA
OVRO
ATCA
rain
Chandra
solar flare
end orbit 1


UT DATE: May 28
UT hours
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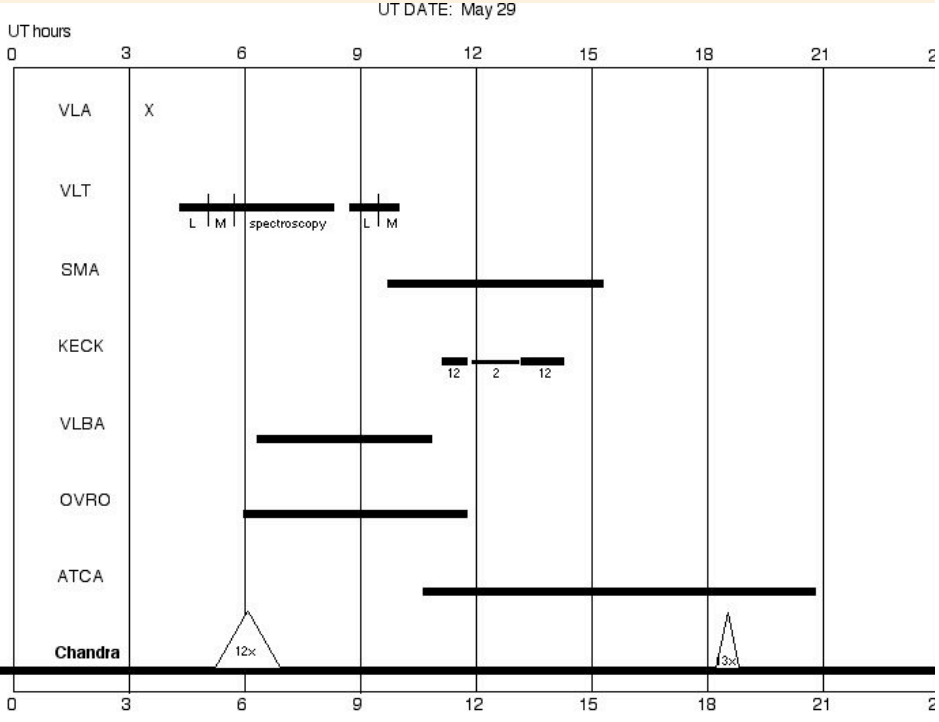
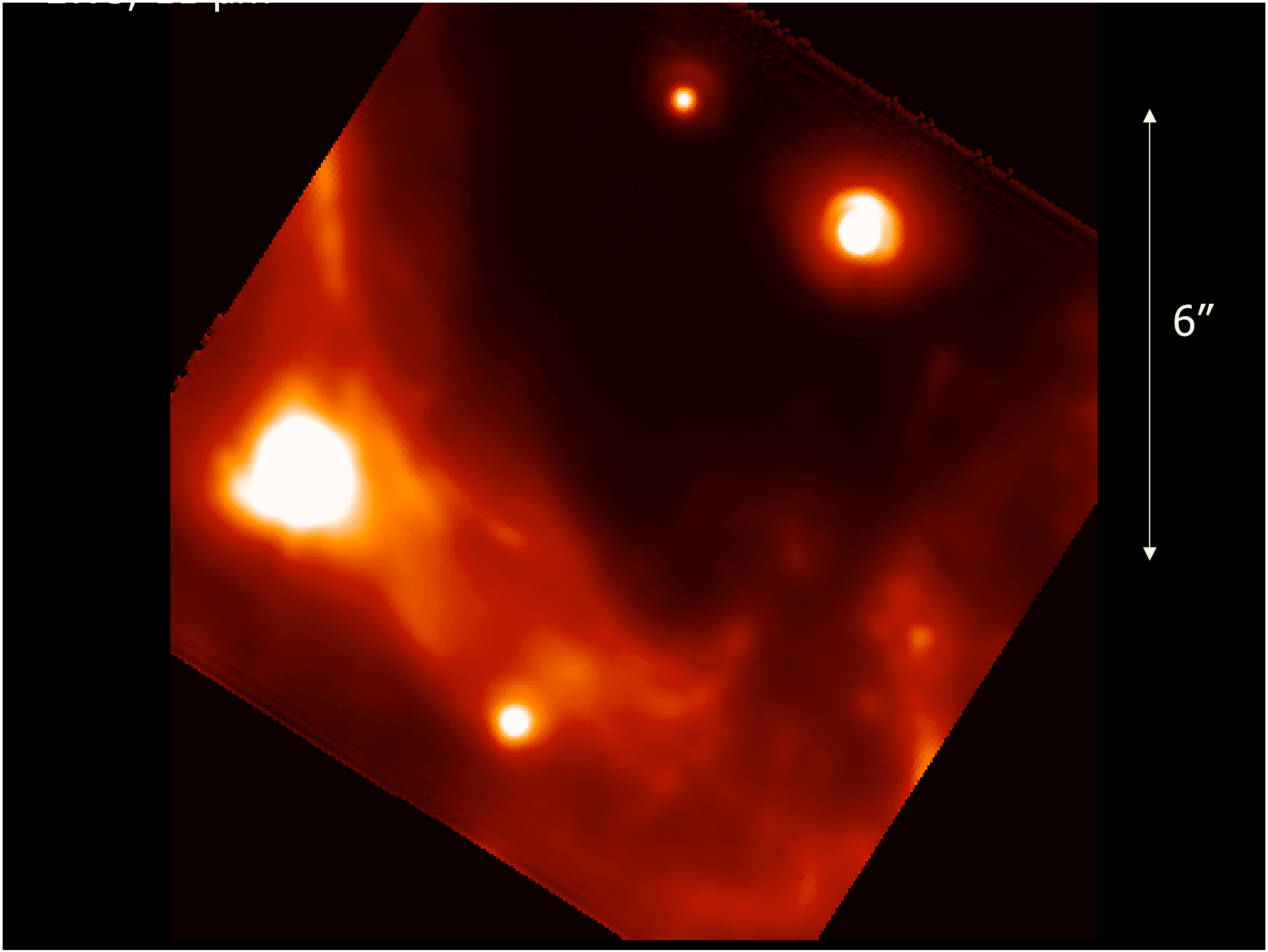
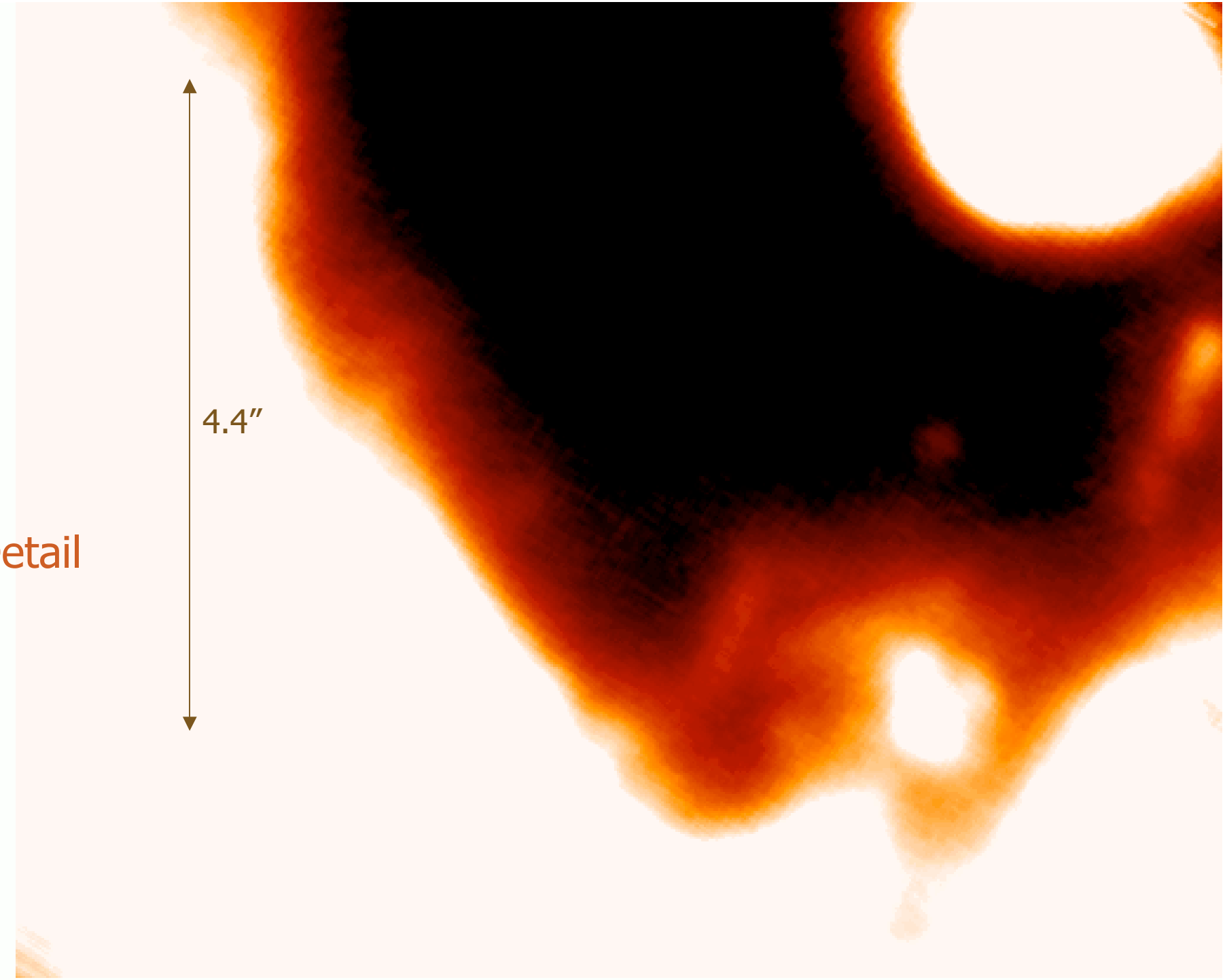
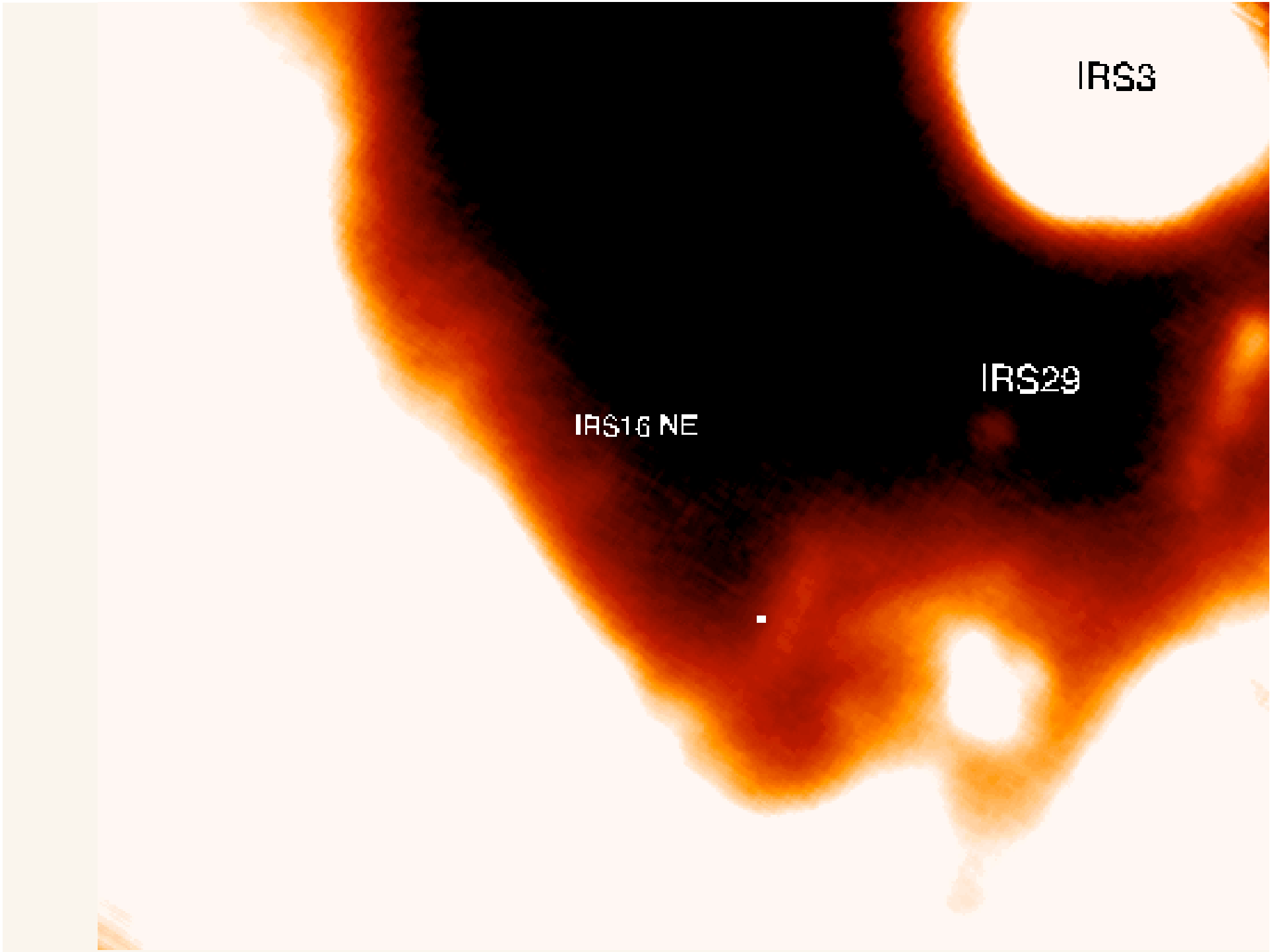
VLA X
VLT
L M L M L M L M
SMA
KECK
12 2 12
VLBA
OVRO
ATCA
Chandra
orbit 3
×25


UT DATE: May 29
UT hours
0 3 6 9 12 15 18 21
VLA X
VLT
L M spectroscopy L M
SMA
KECK
12 2 12
VLBA
OVRO
ATCA
Chandra
12×
3×


6″

Detail




IRS3
IRS29
IRS1G NE

Mid-IR Conclusions

It will be difficult to improve on the steady-state limit because of the background spatial variations.

However, a fluctuating component is within reach.

More work needs to be done with this data set

Monitoring the 3mm Flux of SgrA* with the Owens Valley Millimeter Interferometer

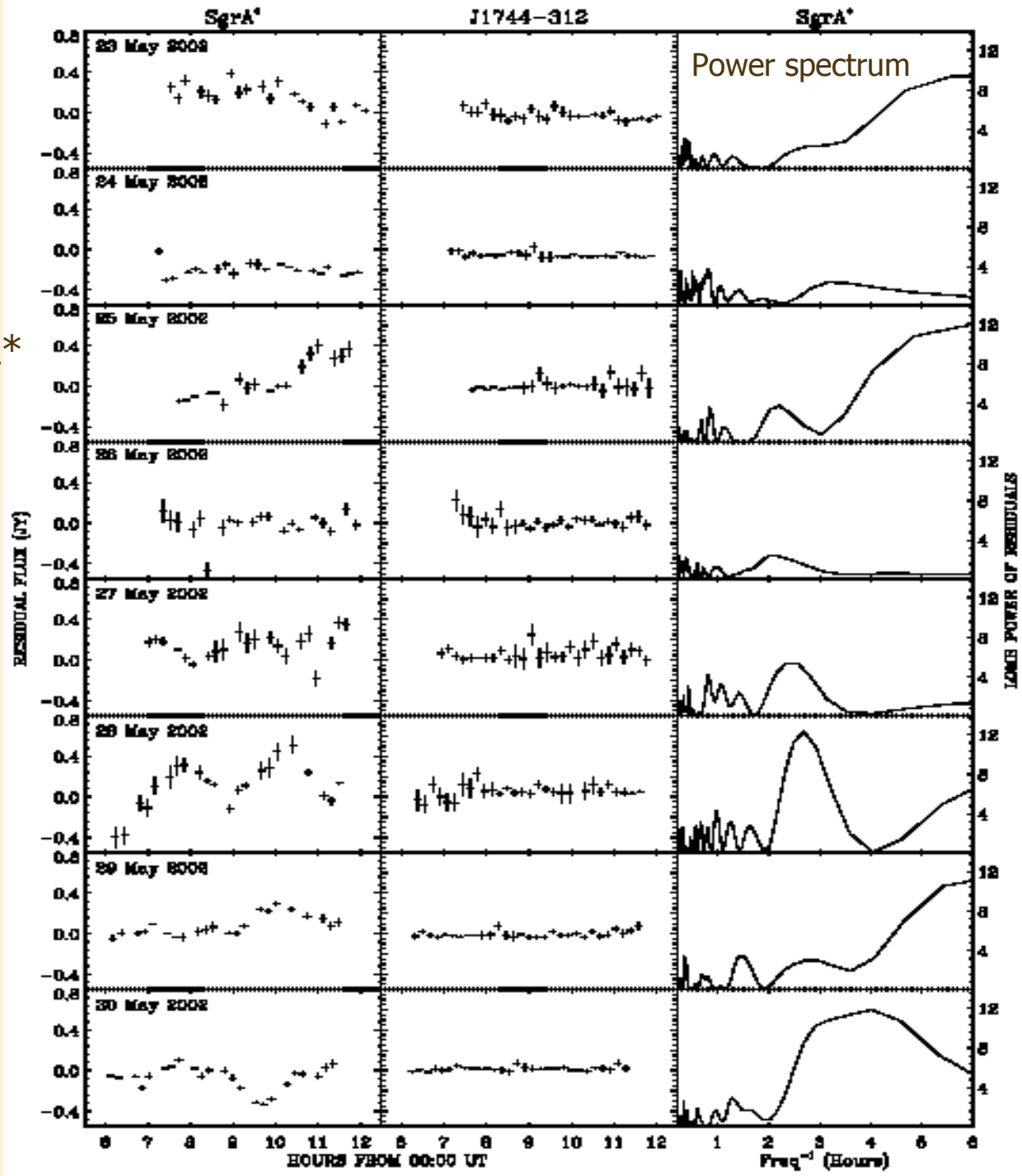
Jon Mauerhan, Mark Morris, Fabian Walter, Fred Baganoff

8 successive days of observations during the May 2002 campaign

Key: rapid alternation between SgrA* and a nearby calibrator, ~1.5^{o} away. Differencing all done in the UV plane with respect to an average determined from the rest of the data set.

4-min bins

Flux=0 corresponds to 1.8 Jy for SgrA*



Conclusions

Clear variability not attributable to atmosphere, antenna gains, but like Zhao's SMA result, cannot rule out variable polarization as the cause, *except* that the 99-GHz polarization is below the 150-GHz depolarization threshold.

Amplitude of few-hour (~2.5-hour) variations varies with mean flux (tentative).

Apparent quasi-periodic variations are not phased from day to day.