



SMA Observations of Sgr A*

Jim Moran



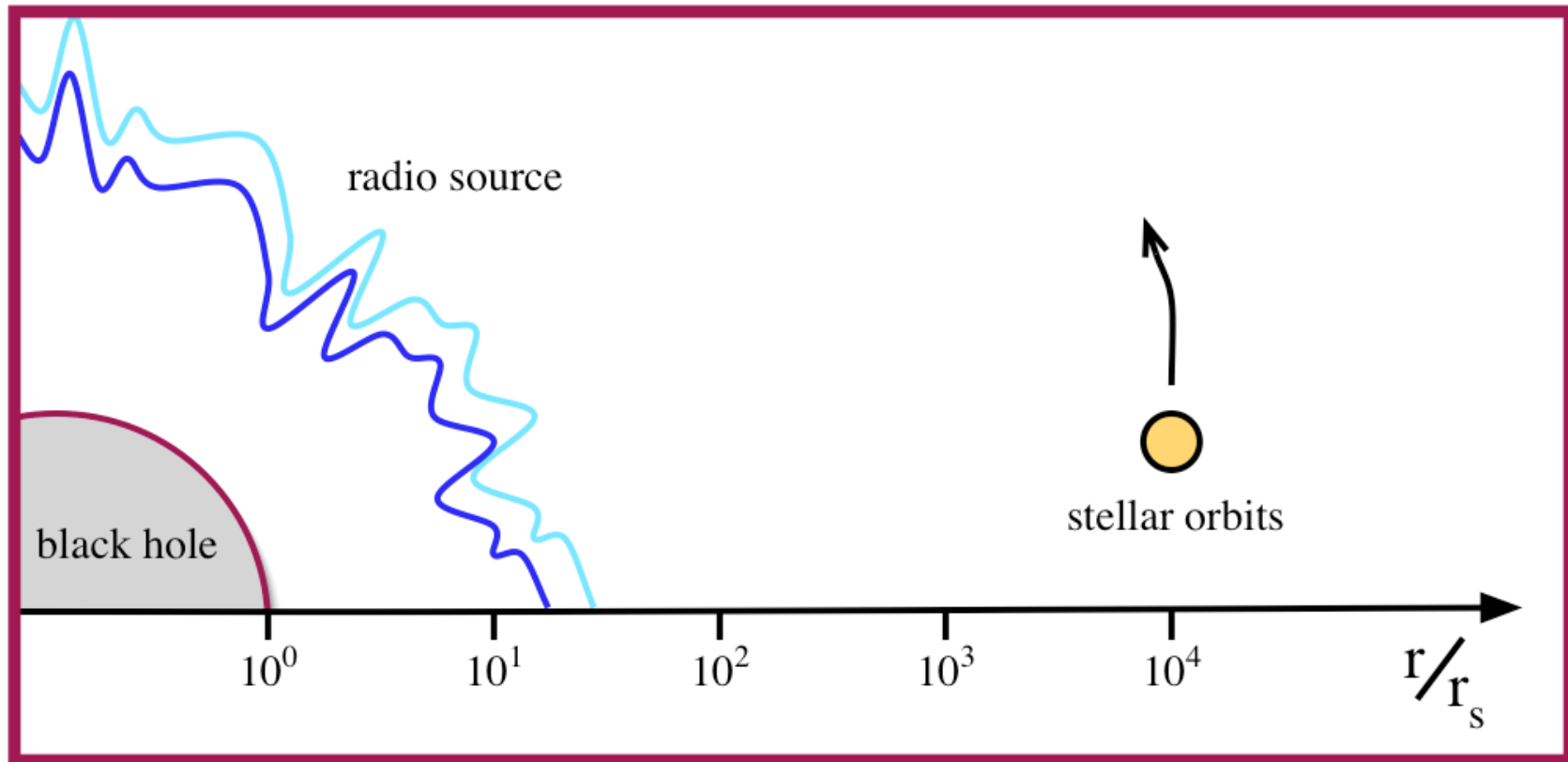
SMA Observations of Sgr A*

PhD Thesis Results of Dan Marrone, Harvard U., 2006

- Rotation measure determined and found to vary by less than
- 30 percent.
- Intraday intrinsic polarization variations measured.
- Peak of the “Submillimeter Bump” is at about 500 GHz
- First detection of a submillimeter flare associated with an
- X Ray flare.



Some Scales in the Galactic Center



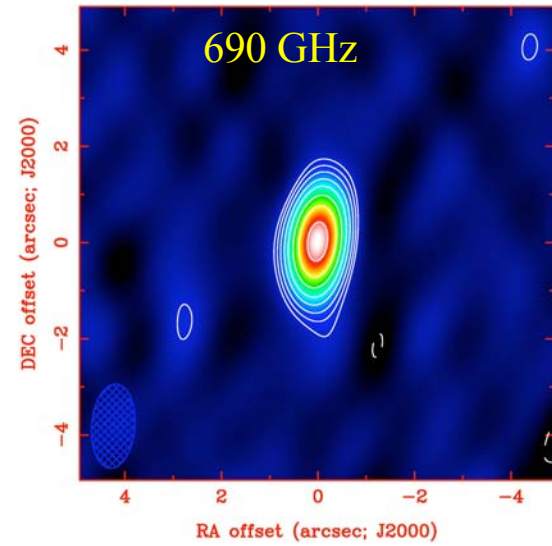
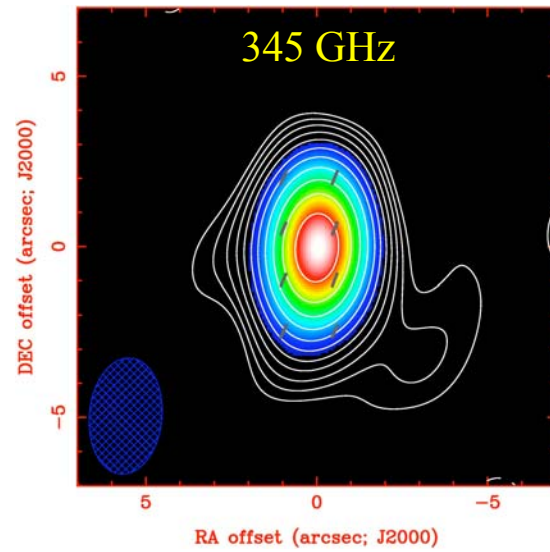
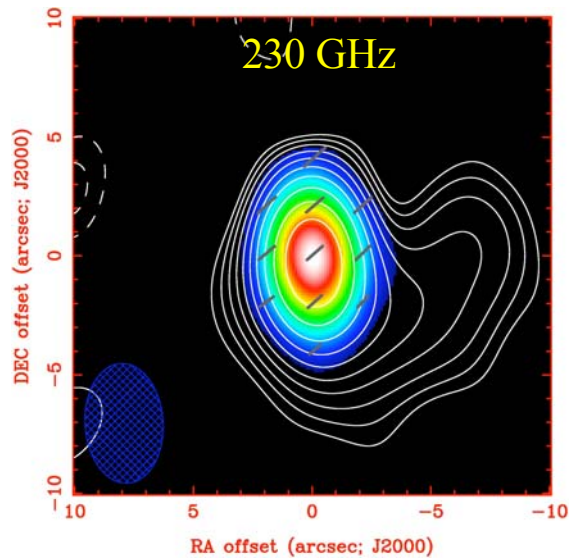


Star

[Click here to view Star movie](#)

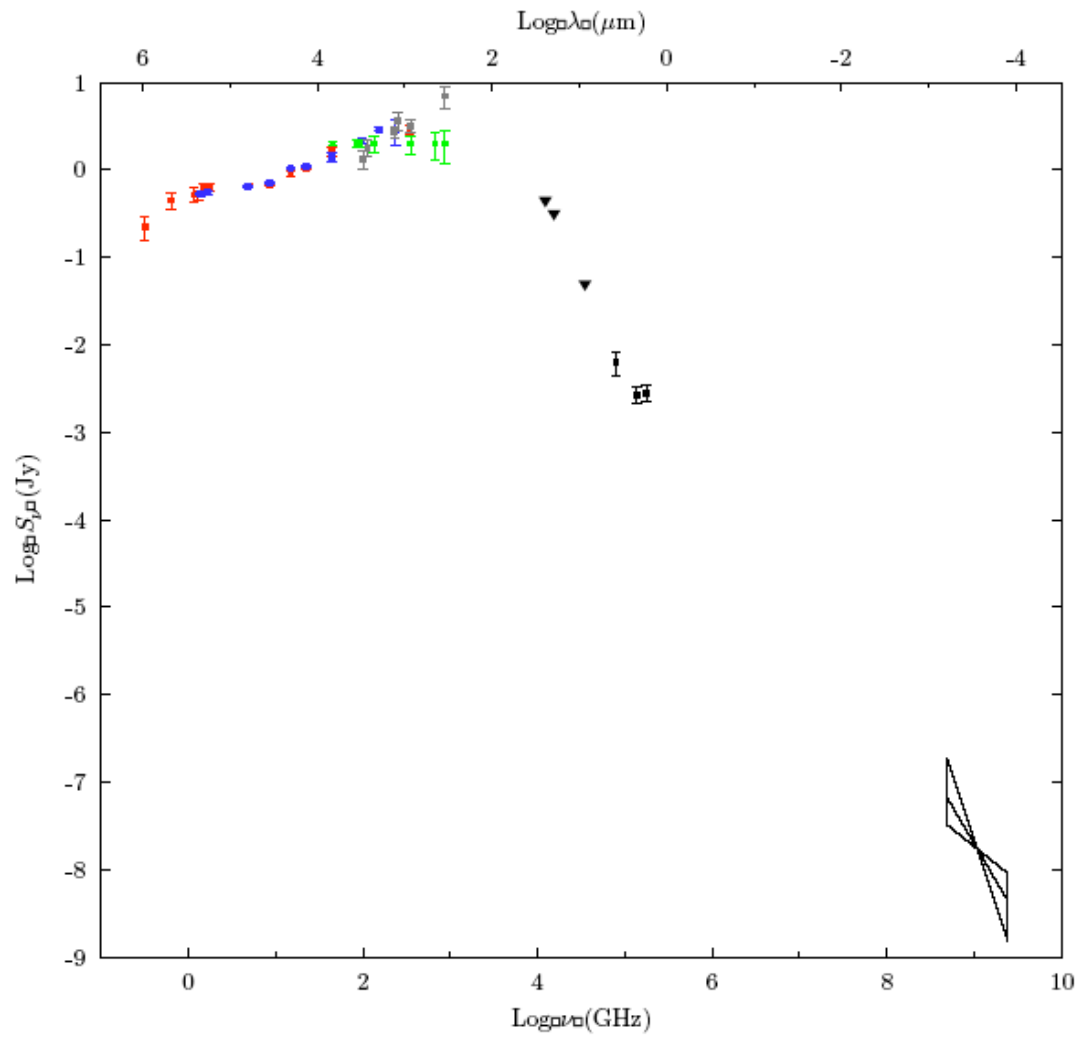


Polarization at Various Wavelengths



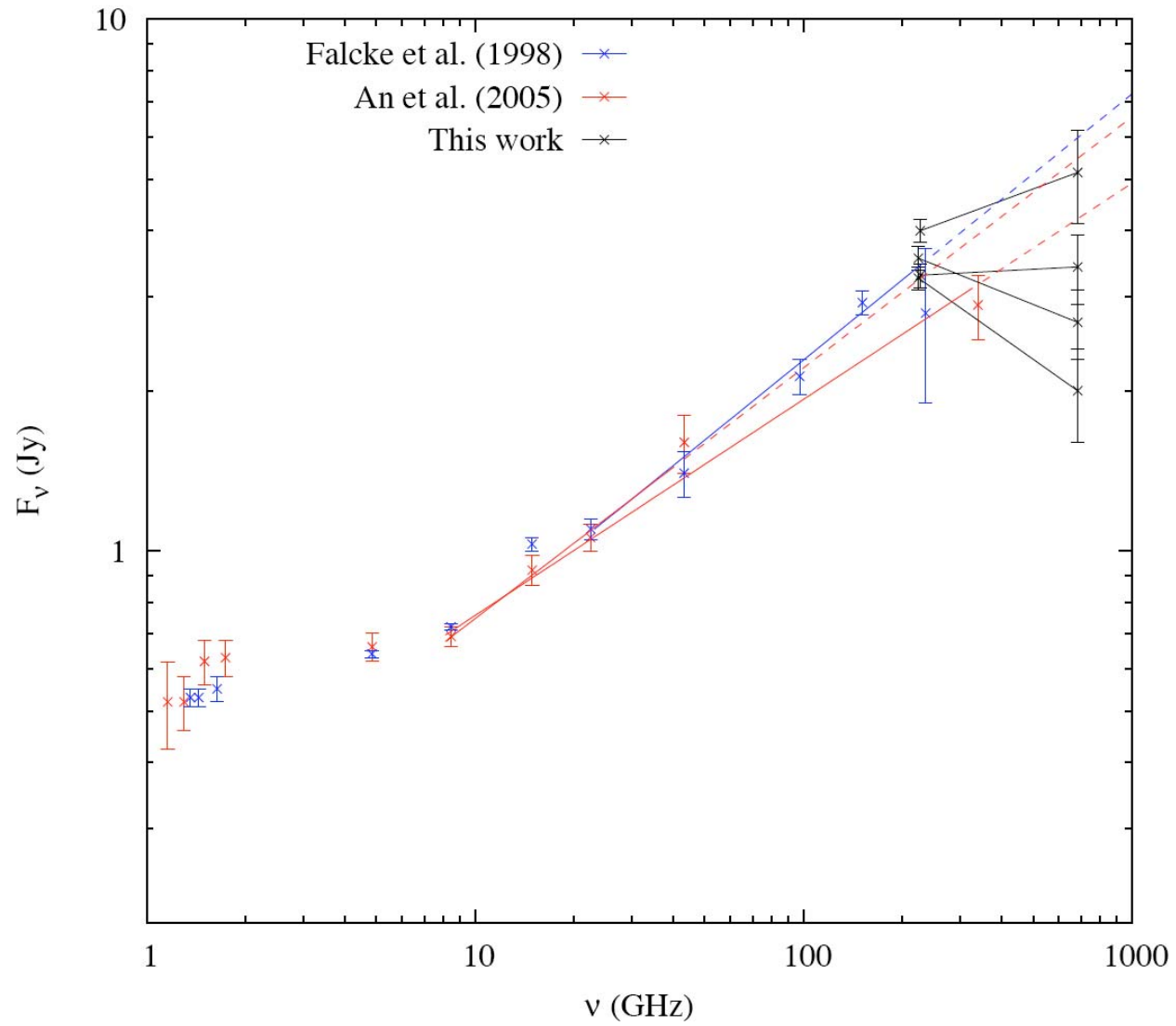


SED for Sgr A*





Radio-Submillimeter Wavelength Part of SED





A HUNGRY BLACK HOLE





Accretion Rate and Faraday Rotation

$$\chi(\lambda) = \chi_0 + \lambda^2 RM$$

$$RM = 8.1 \times 10^5 \int n_e \mathbf{B} \cdot d\mathbf{l}$$

- $RM = -5.1 \times 10^5 \text{ rad/m}^2$

Assumptions:

equipartition

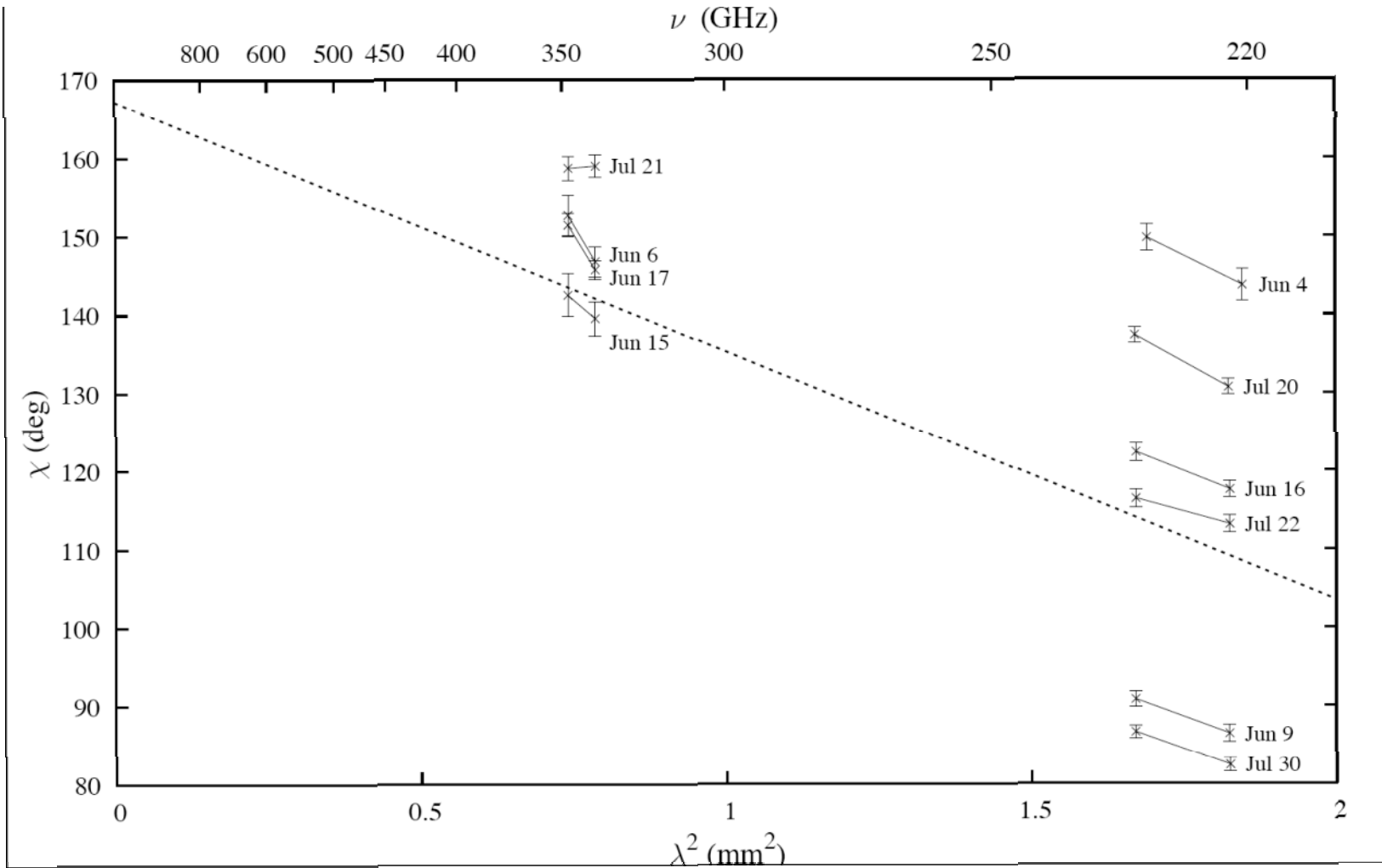
density power law

inner radius cutoff of Faraday screen

- $\text{Accretion Rate} = 10^{-9} - 10^{-7} M_{\text{Sun}}/\text{yr}$

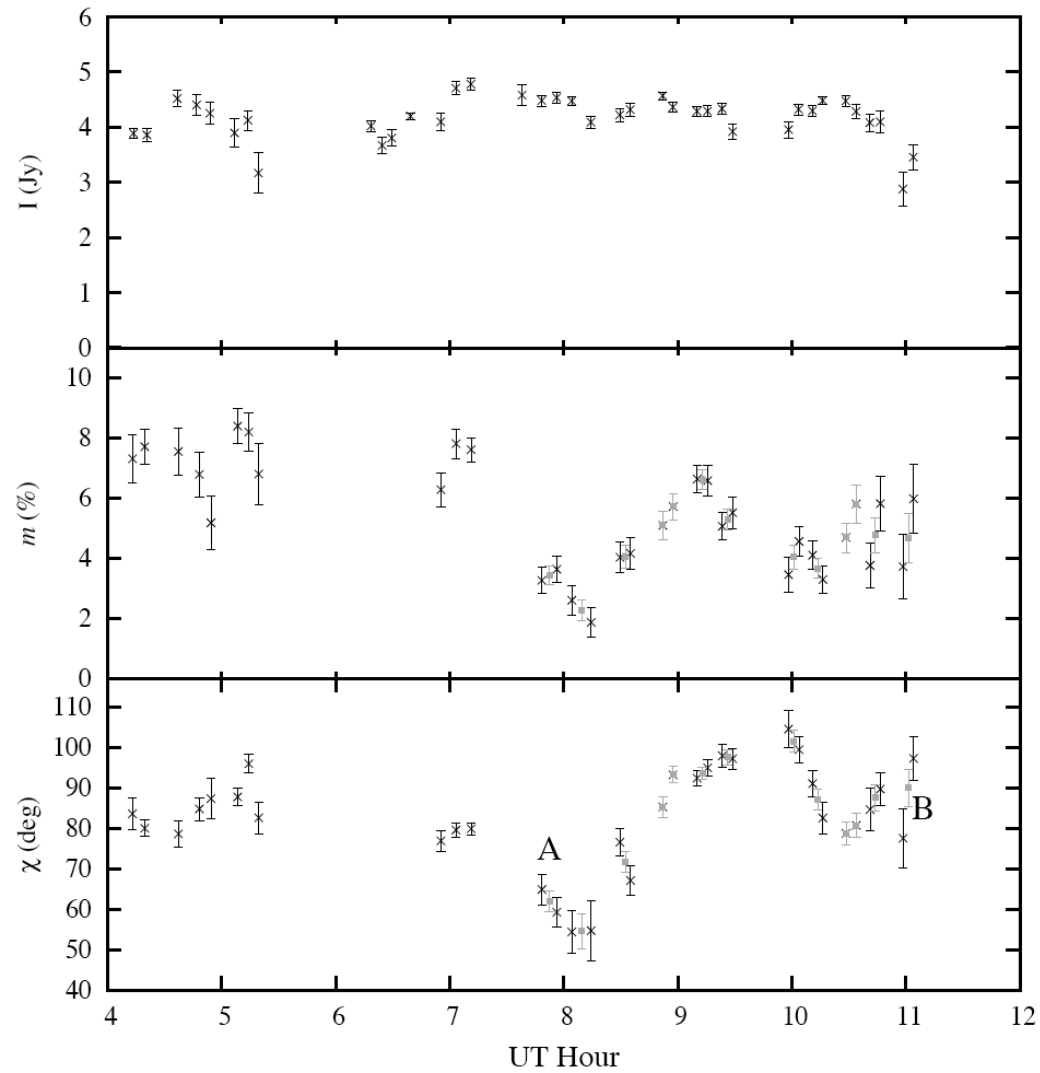


2005 SMA Measurements of Faraday Rotation in Sgr A*



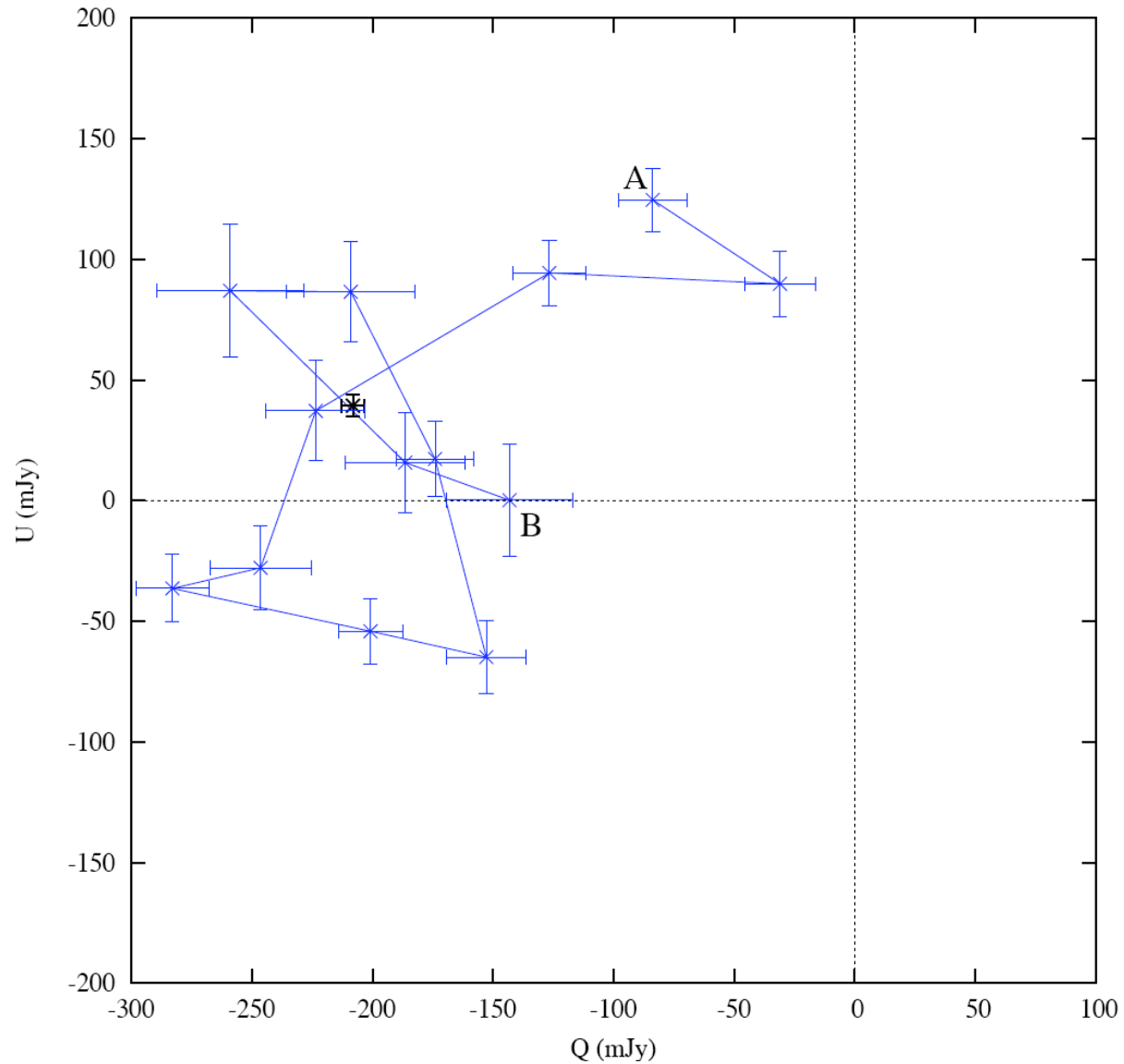


230 GHz Light Curve for Sgr A*, July 30, 2005





Polarization Event of July 30, 2005 in Sgr A* (3 hours)



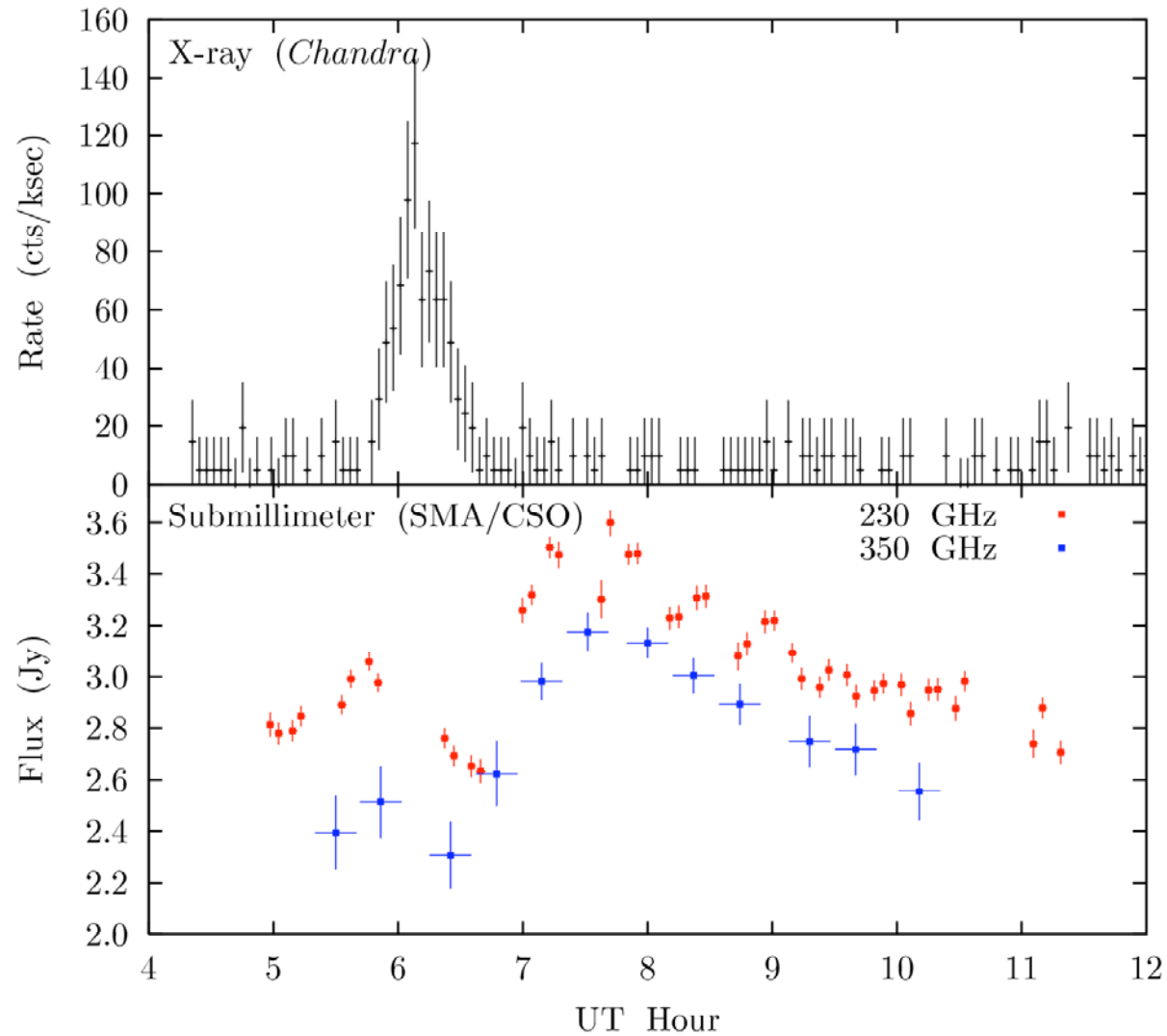


a0 256

[Click here to view a0 256 movie](#)

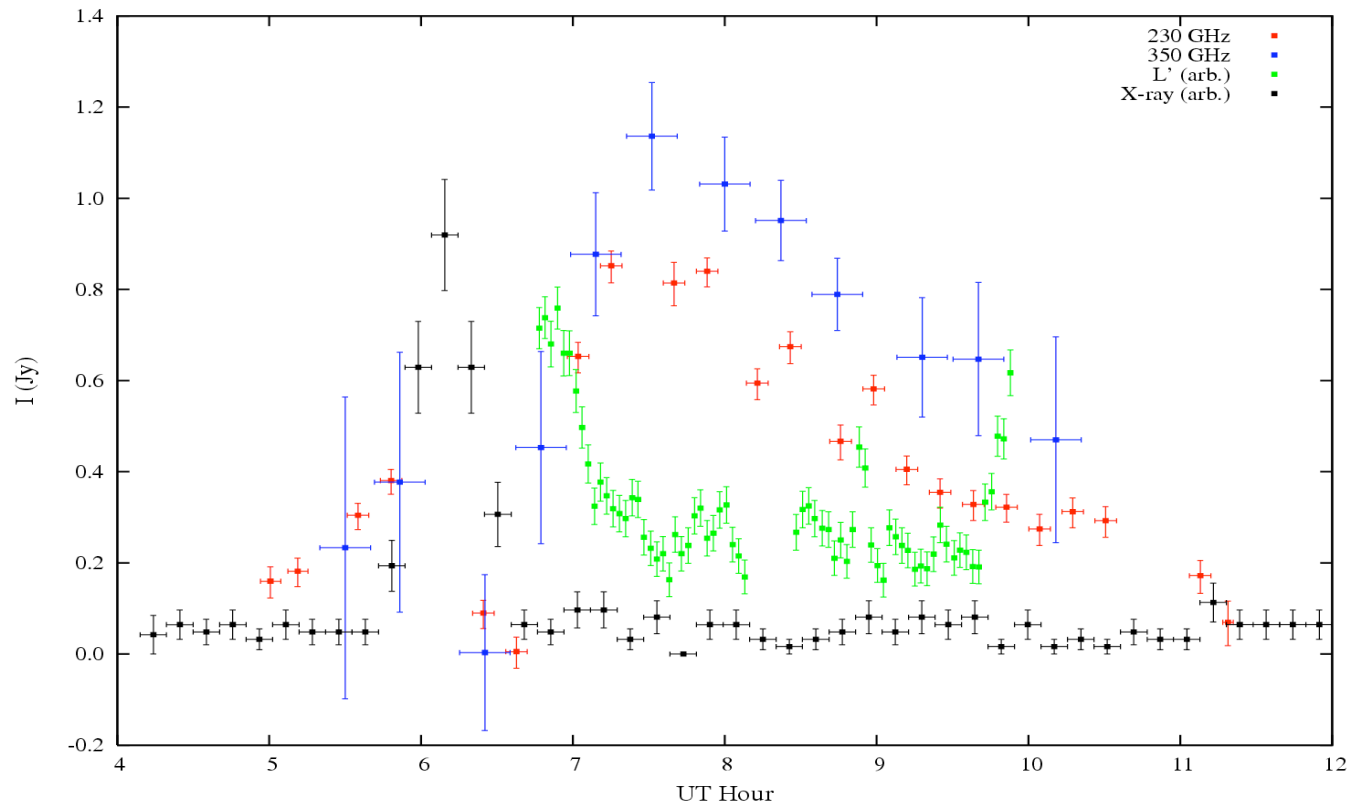


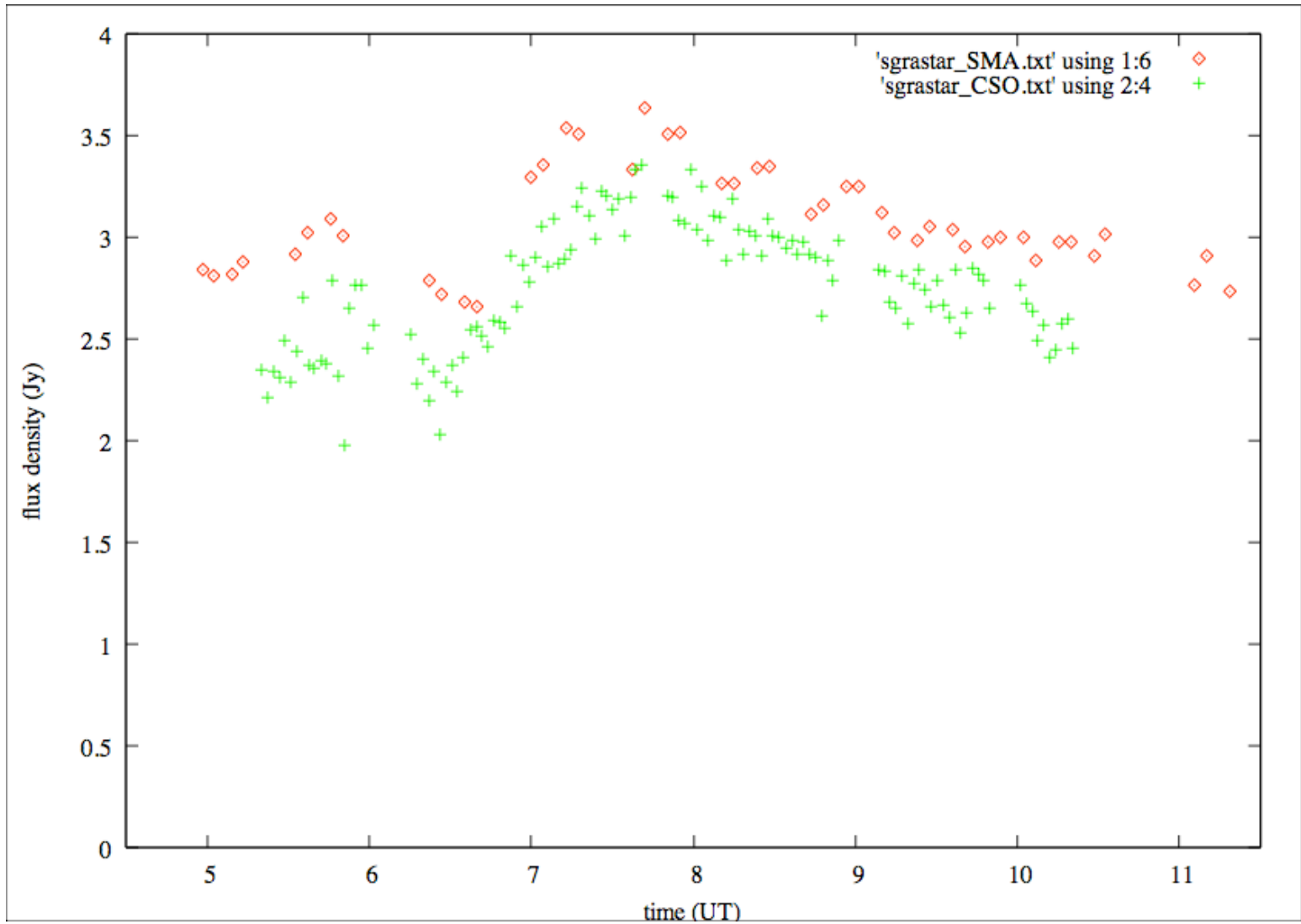
Flare in Sgr A* on July 17, 2006





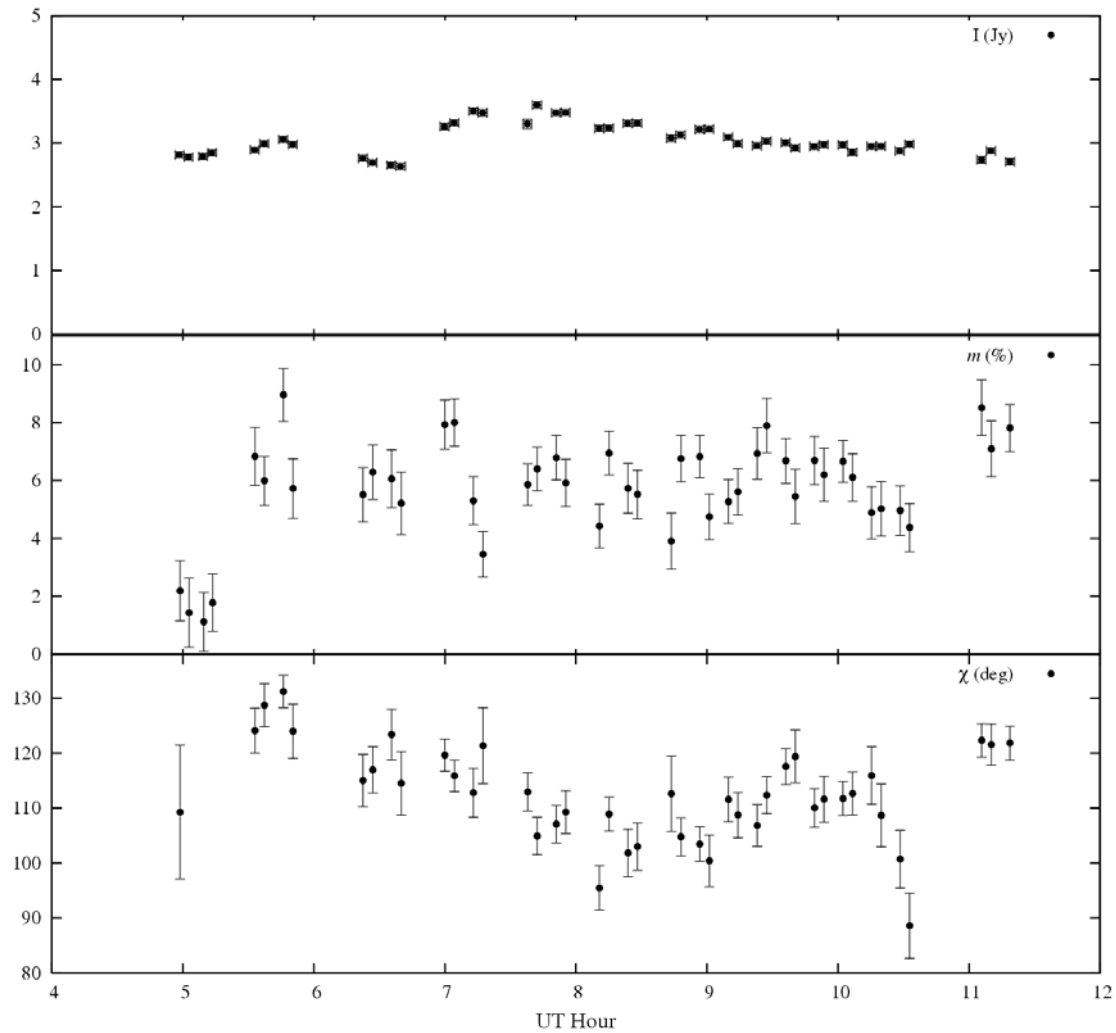
July 17, 2006 Flare







July 17, 2006 Flare





Sgr A*

[Click here to view Sgr A* movie](#)



Polarization of Sgr A* at 230 GHz (1.3 mm) (SMA)

