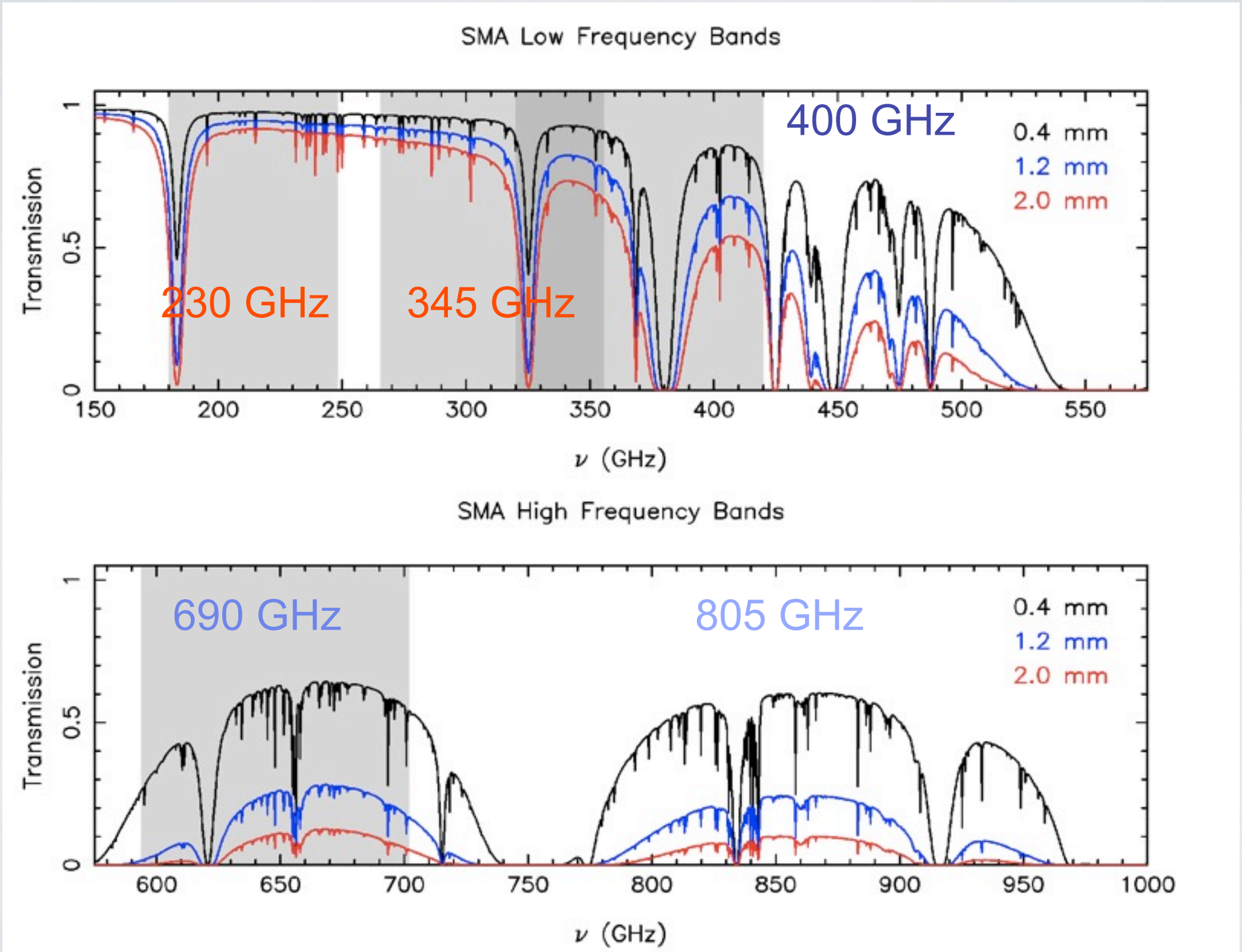
The Latest Status of the Submillimeter Array (SMA)

Naomi Hirano (ASIAA, Taiwan)

Since 2003

Receiver Bands/Atmosphere



Array configurations

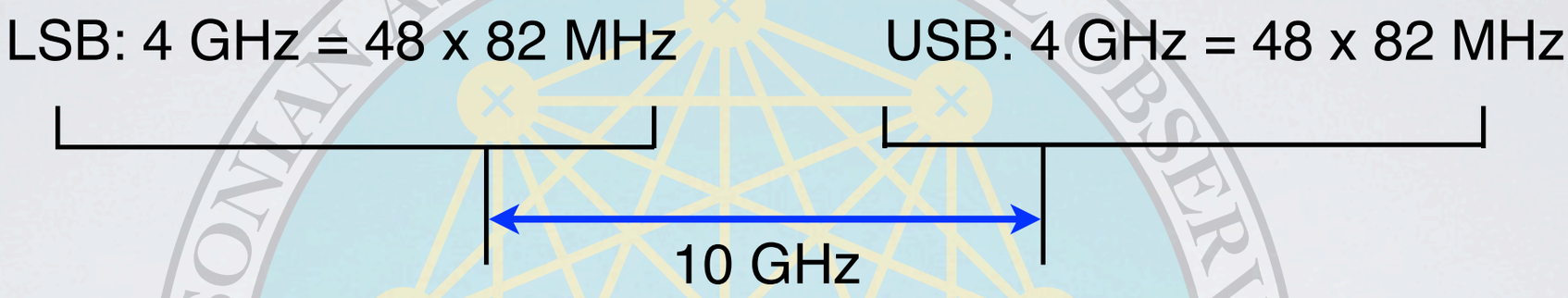
θ (radian) ~ λ (wavelength) / D (diameter)

Longest baseline : 509 m

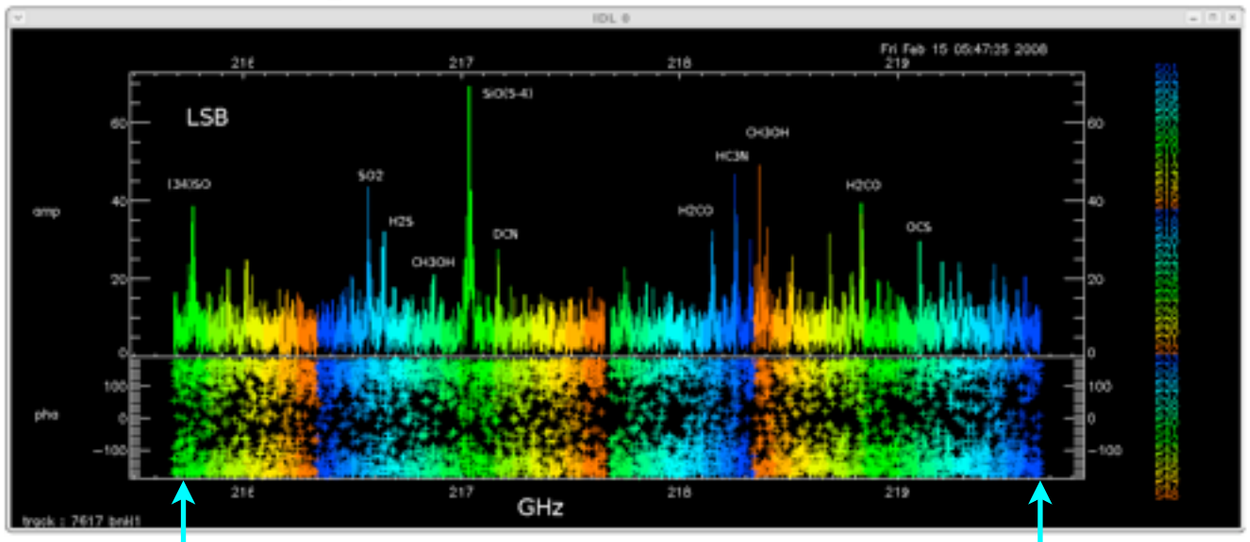
angular resolution: ~0.3” @ 345 GHz

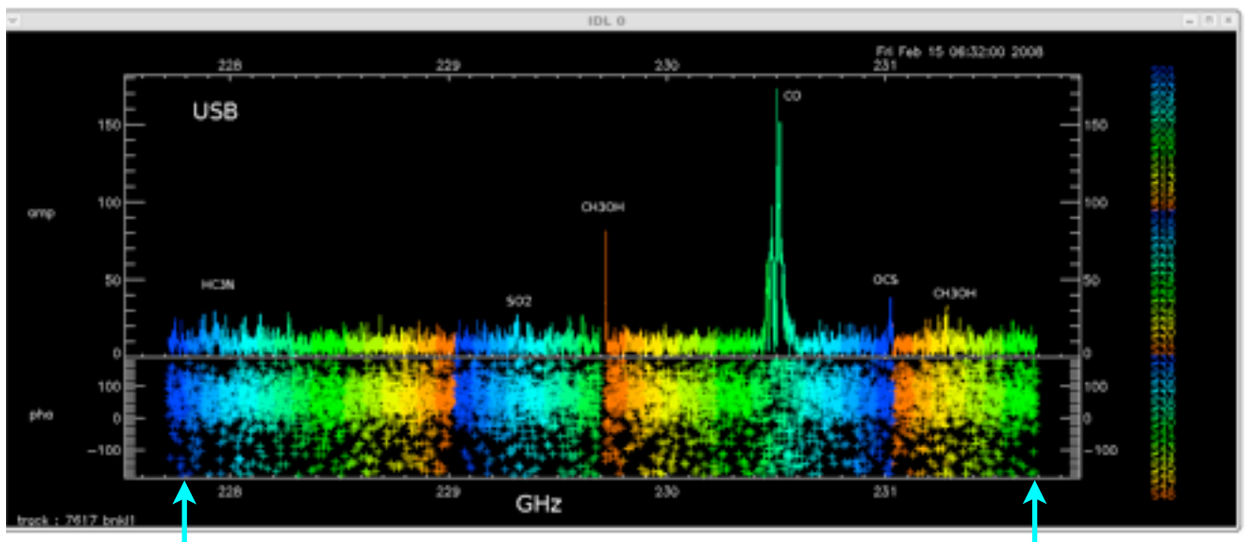
Shortest baseline : 9.5 m

The Capability of wide bandwidth



The spectra from Orion KL





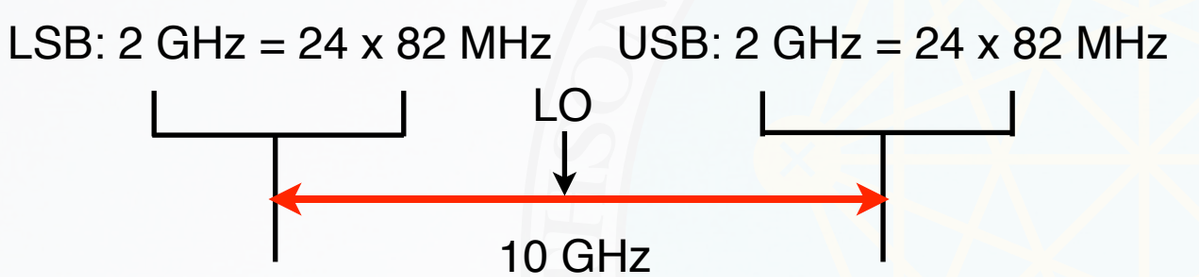
215.7 GHz — 219.7 GHz — 227.7 GHz — 231.7 GHz

4 GHz + 4 GHz can be observed at the same time.

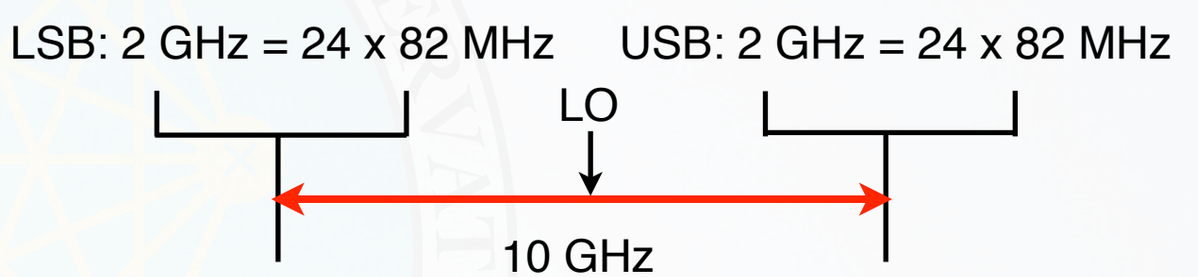
Dual band mode

2 receivers, 2 GHz (each) mode

low freq. receiver



high freq. receiver



Rx230 *or* Rx345 & Rx400 (Rx690)

ex.
CO 3–2 & SiO 8–7 in Rx 345 + CO 3–2 & SiO 8–7 in Rx400
CO 2–1 in Rx230 + CO 3–2 in Rx400

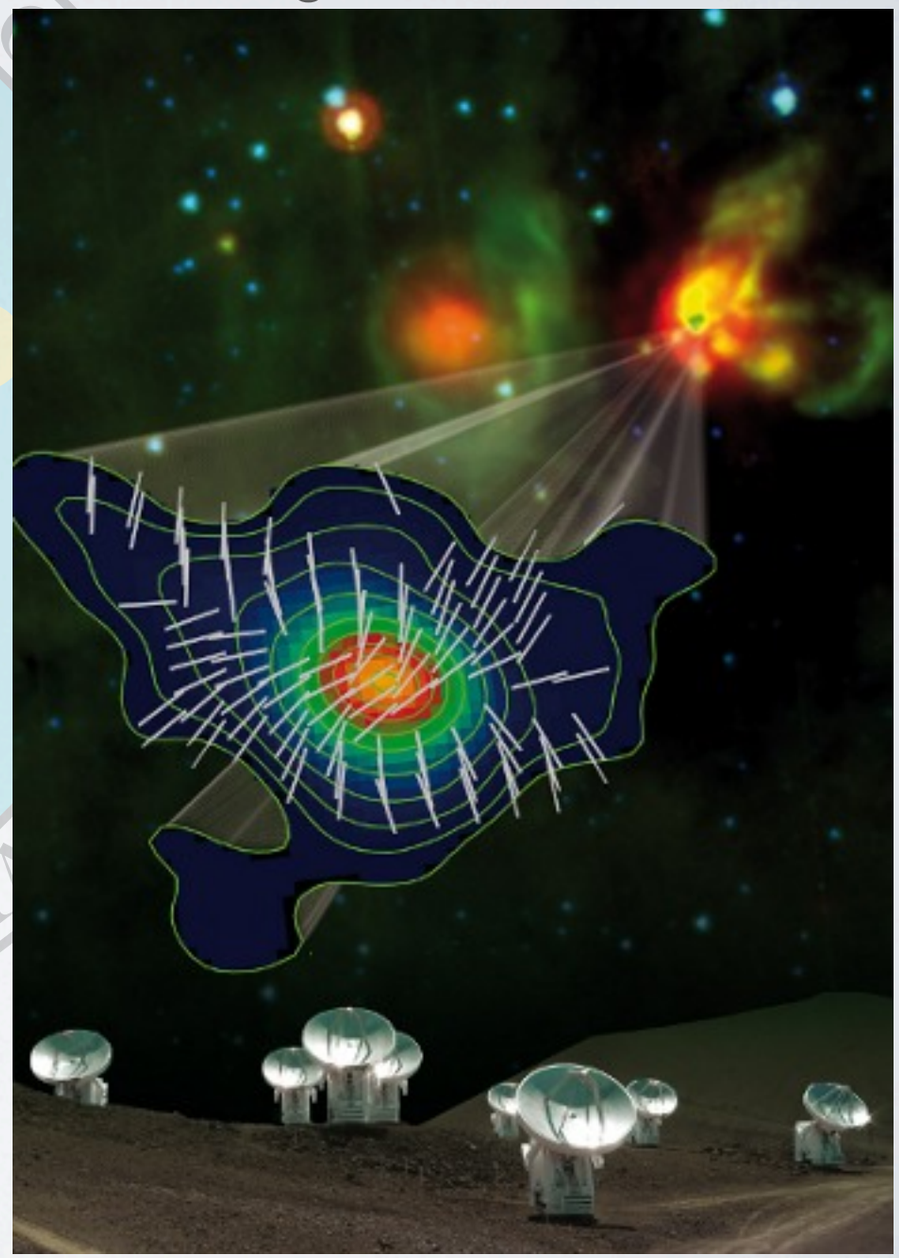
Polarization mode

Continuum & lines

Dual receiver (Rx 345 + Rx 400) mode @ 330–355 GHz is available!!

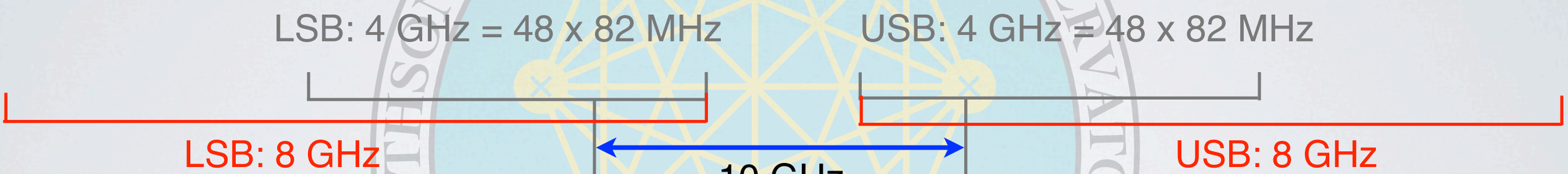
using quarter-wave plates 230/(690), 342, 240/400 GHz

870 μm dust continuum emission from the massive star forming region G31.41



Josep Miquel Girart (CSIC-IEEC), Nimesh Patel (Harvard-Smithsonian Center for Astrophysics) and Manel Carrillo

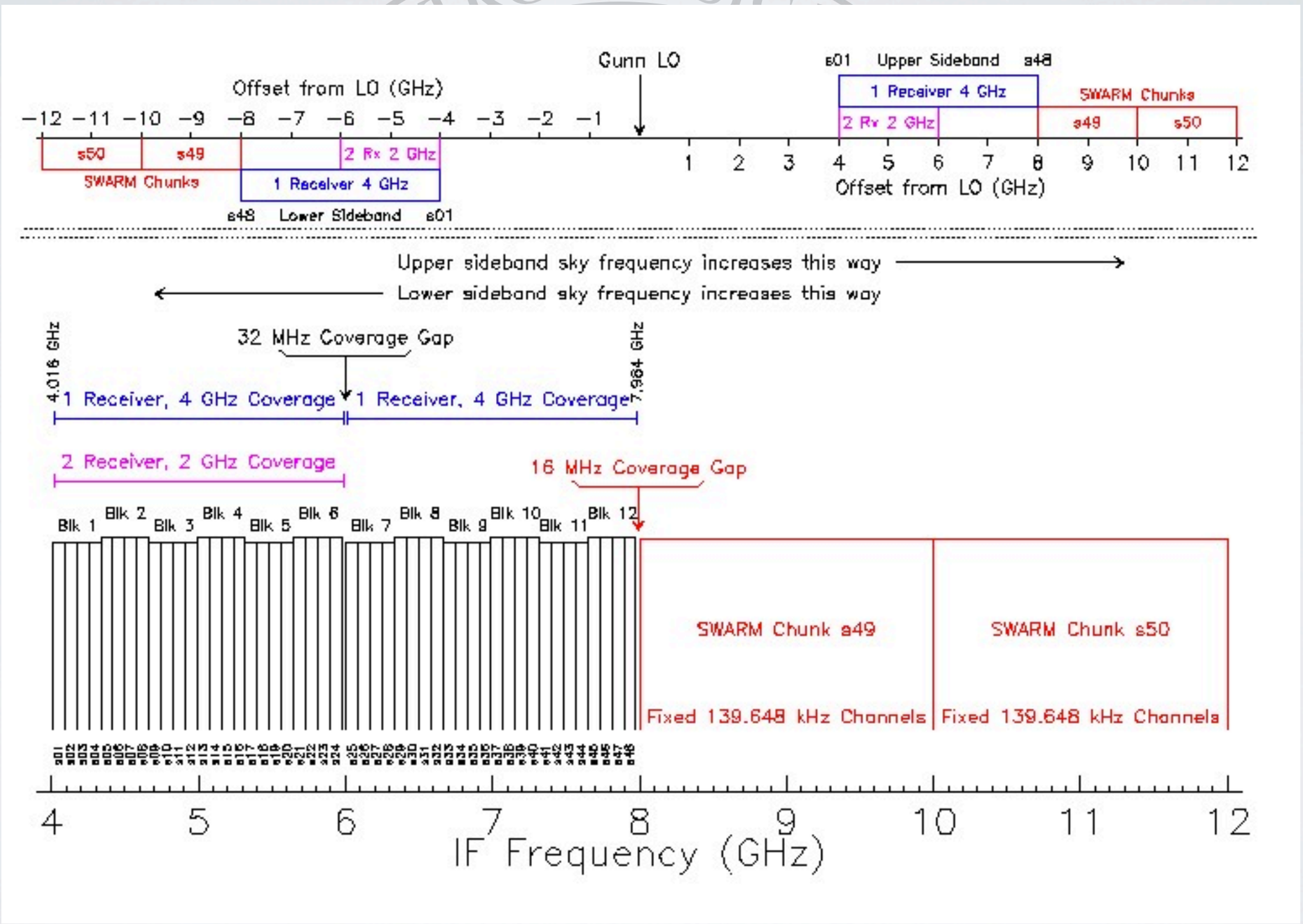
The New Capability for Rx 230 & Rx 345



8 GHz + 8 GHz can be observed at the same time.

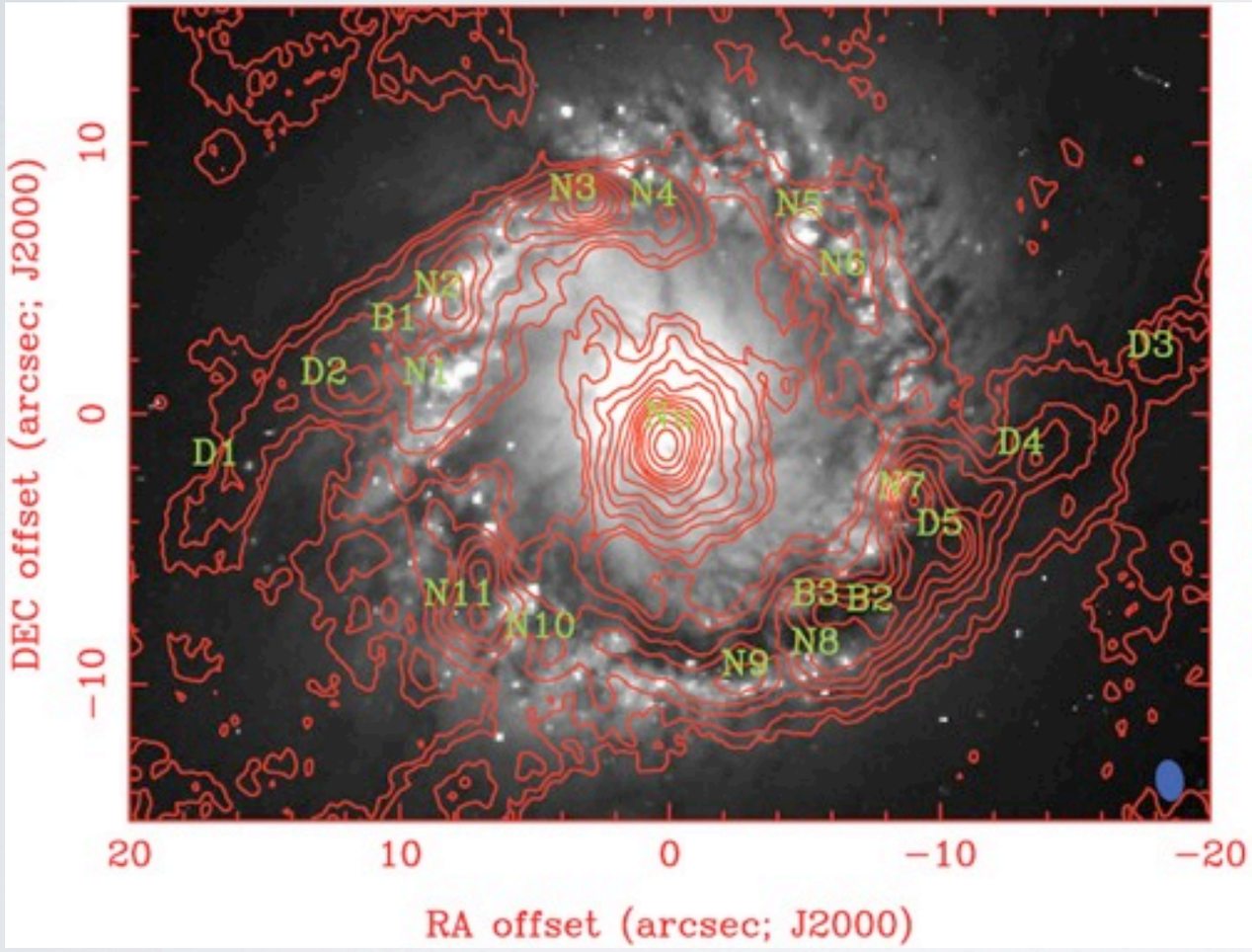
Coming soon!

The “Legacy” and the new “SWARM” correlators



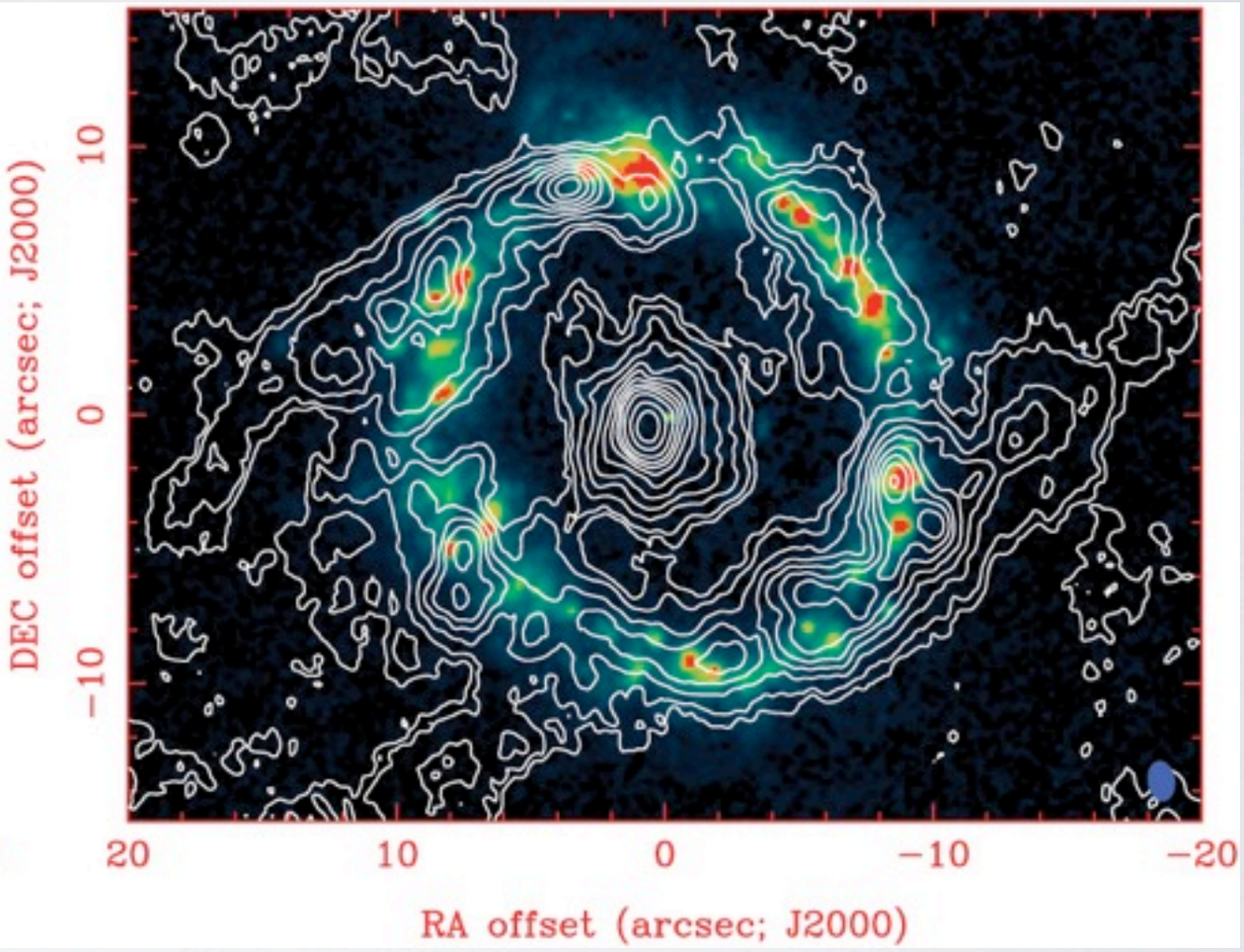
Science highlights

SEYFERT 1 / STARBURST RING GALAXY NGC 1097



CO 2–1 + HST I-band image

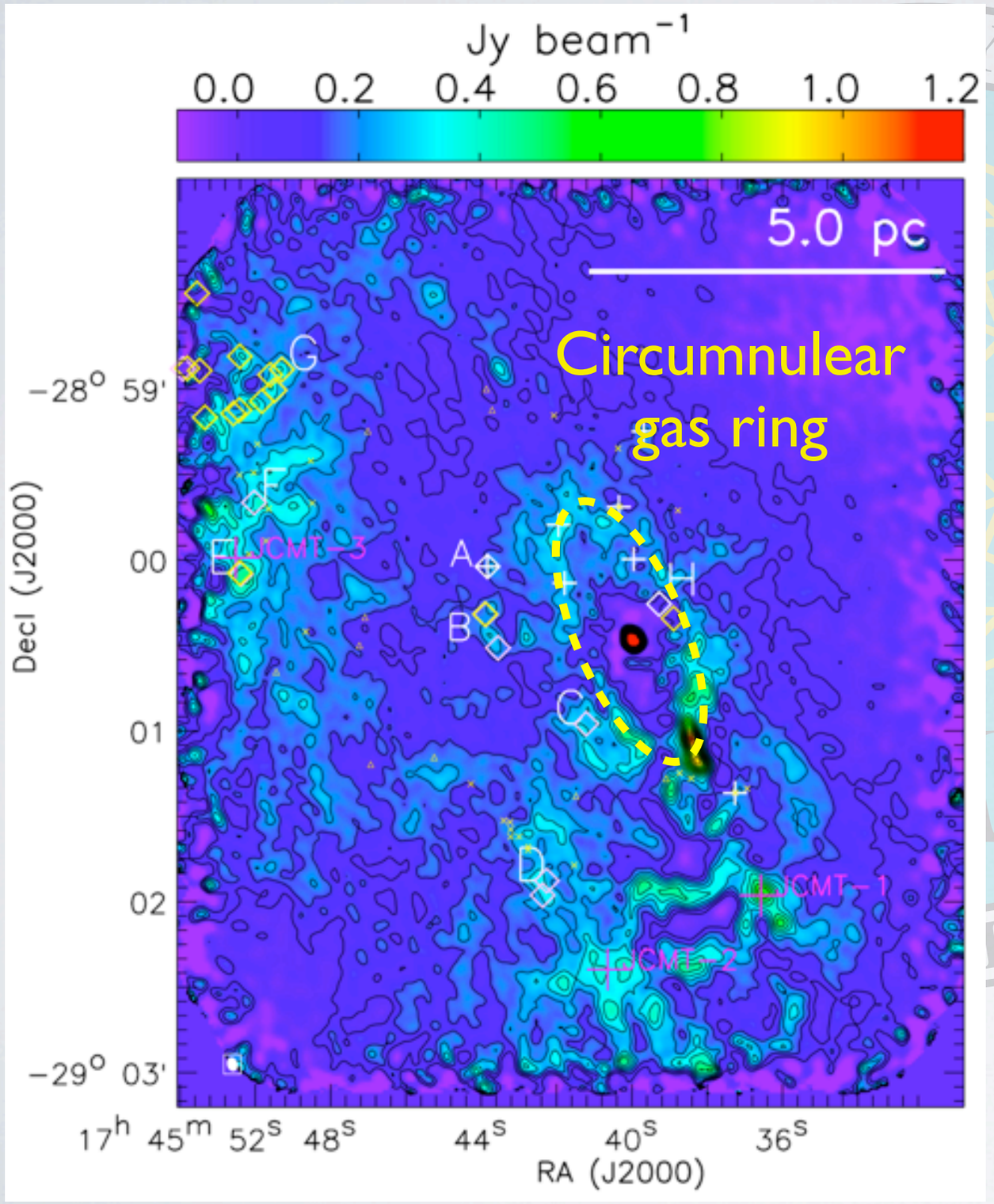
1.5” x 1.0” (105 x 70 pc) resolution



CO 2–1 + HST NICMOS Pa Alpha

Hsieh P.-Y. et al. 2011, ApJ, 736, 129

The First Interferometric 0.86 mm Dust Continuum Image in the Milky Way Center



5’ x 5’ area

157 SMA pointings

+ JCMT

@~5” resolution

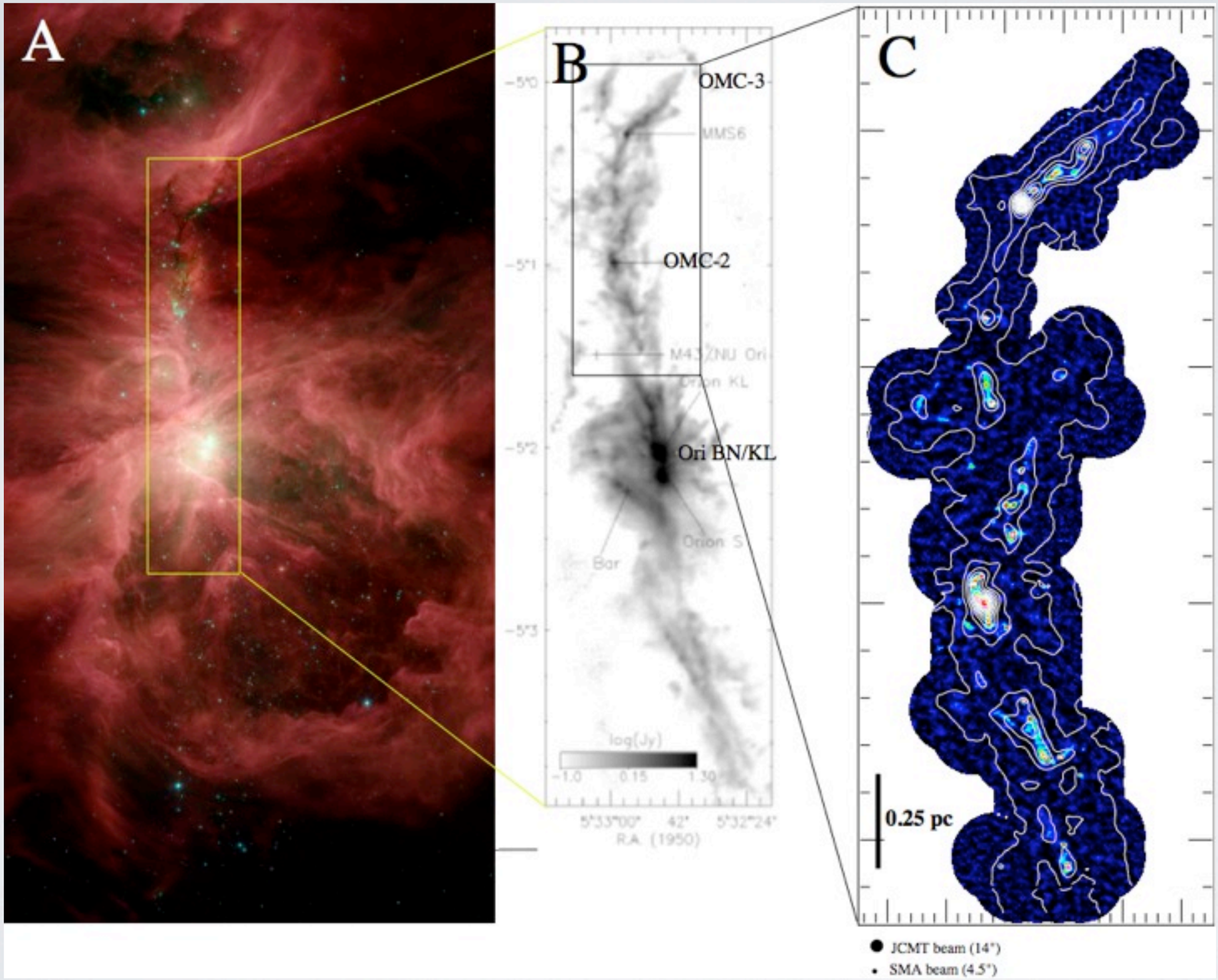
Circumnuclear gas ring

+

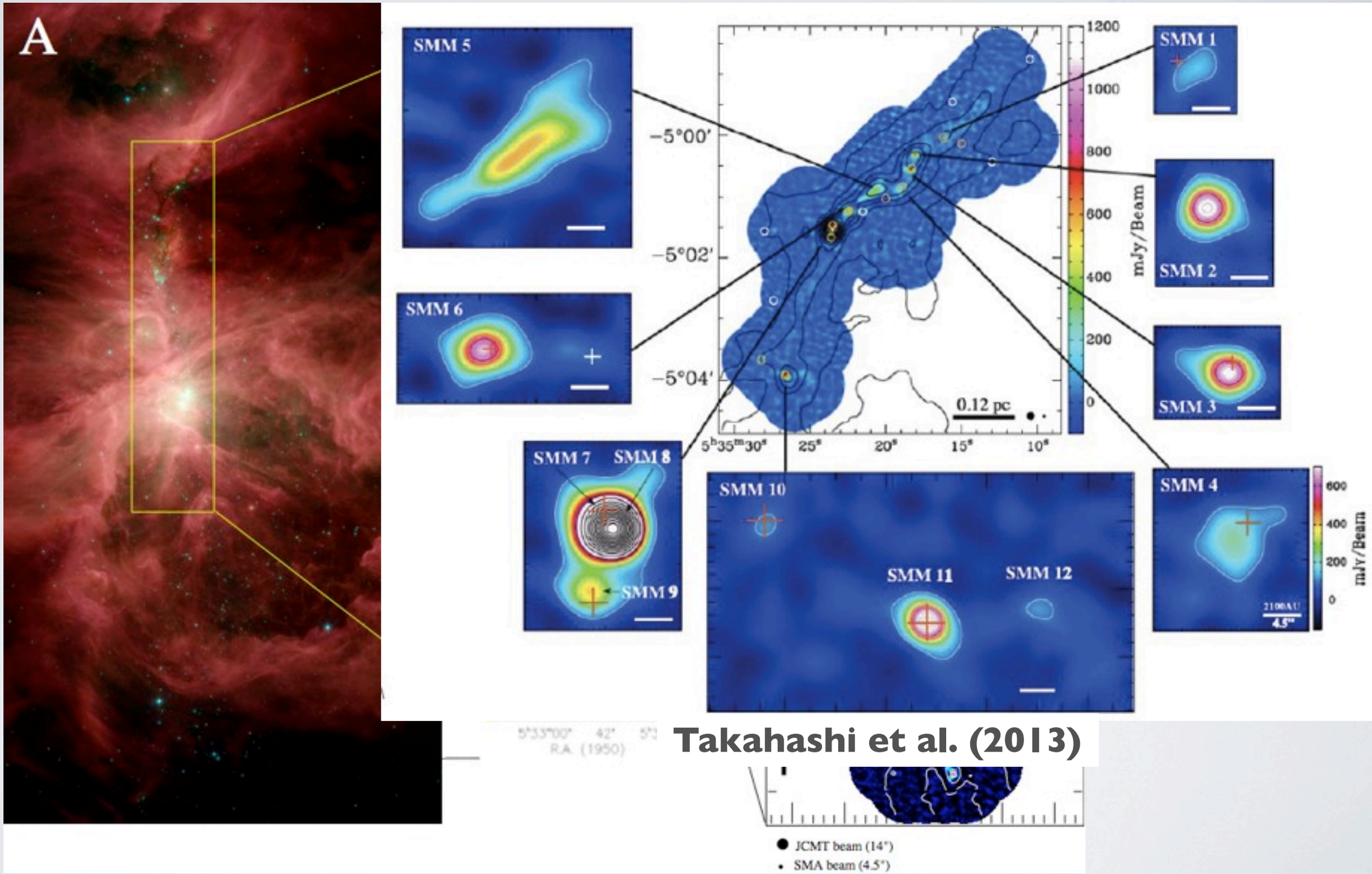
arms/streamers

Liu HB et al. 2013, ApJ, 770, 44

Cores in Orion Molecular cloud

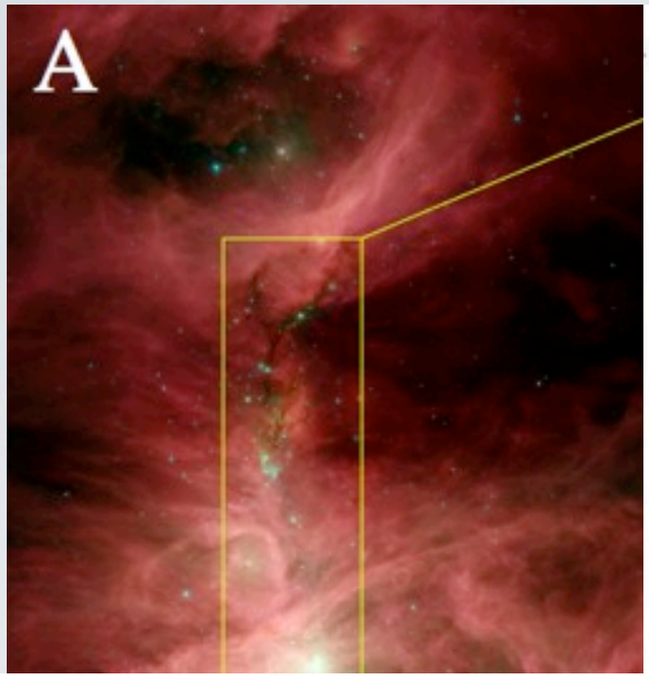


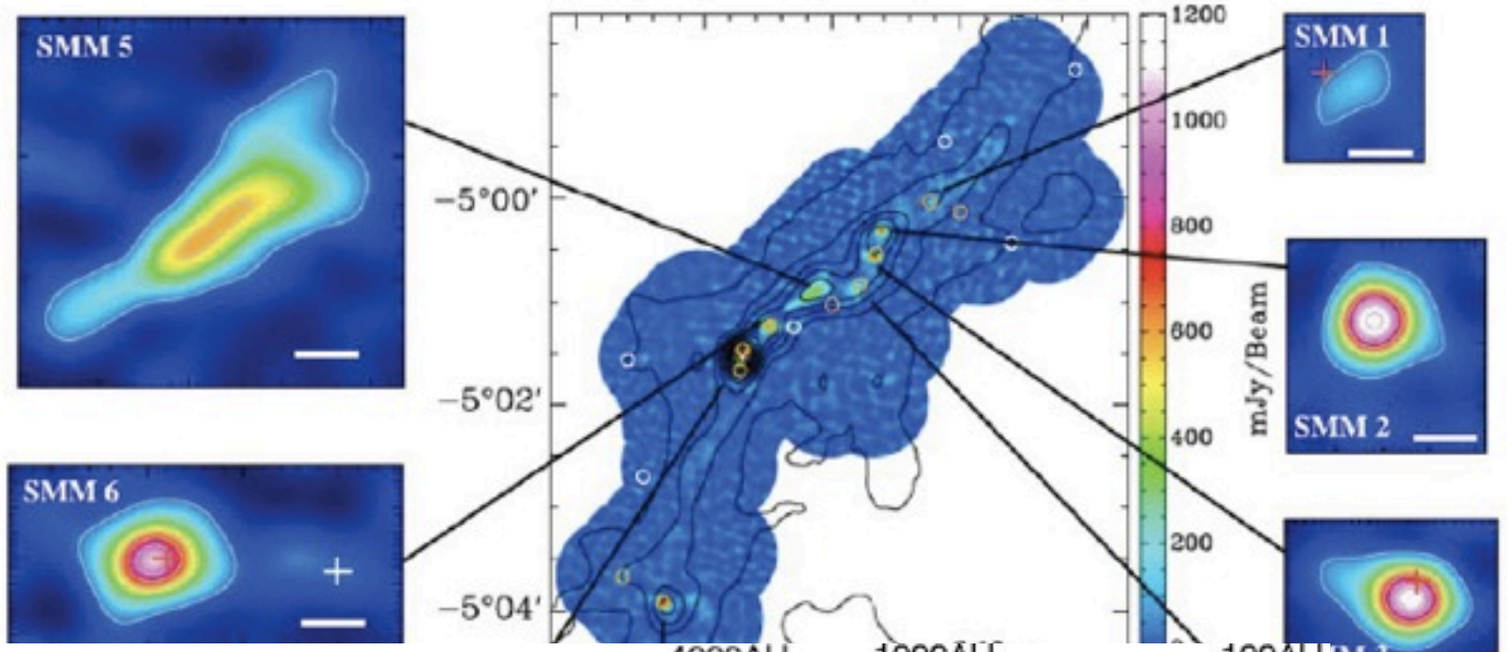
Cores in Orion Molecular cloud



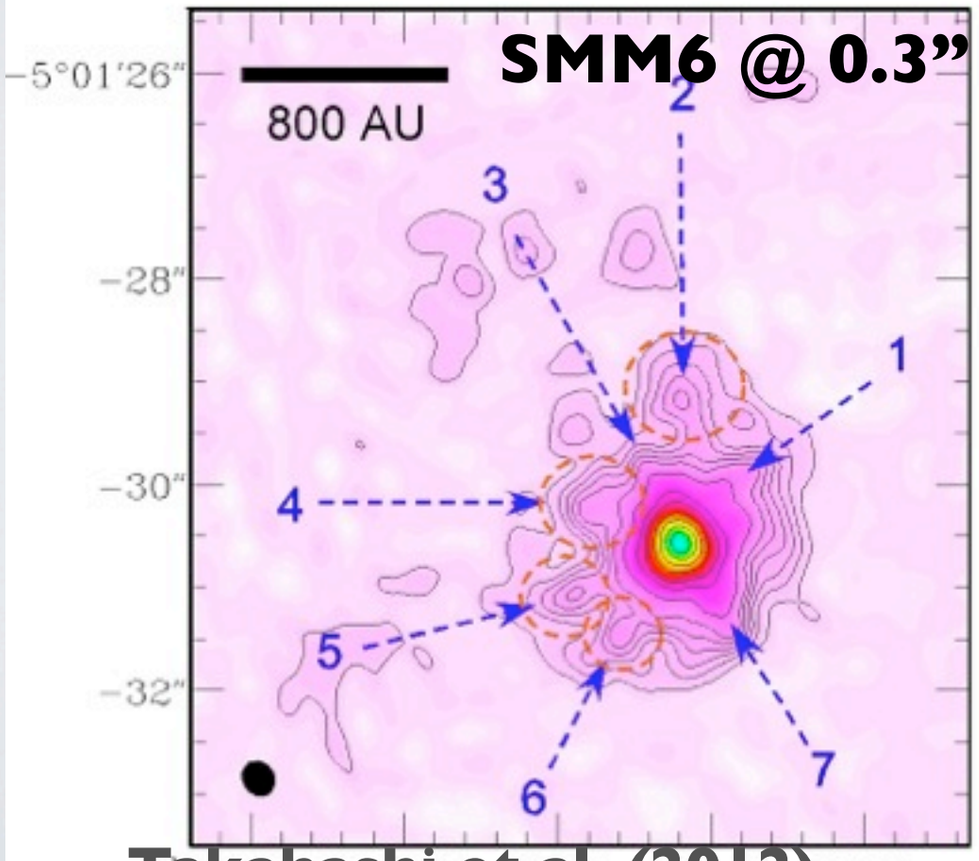
Takahashi et al. (2013)

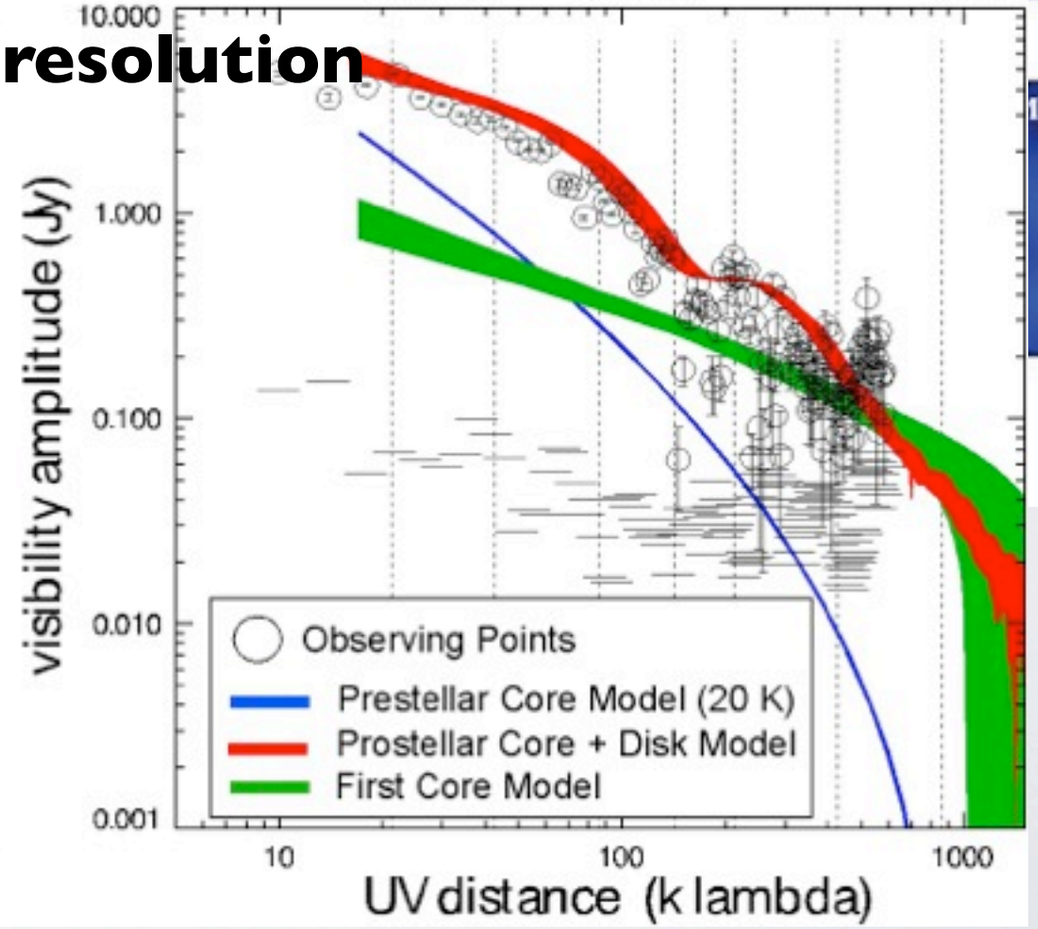
Cores in Orion Molecular cloud

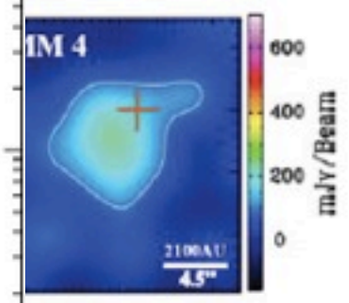




SMM6 @ 0.3” resolution





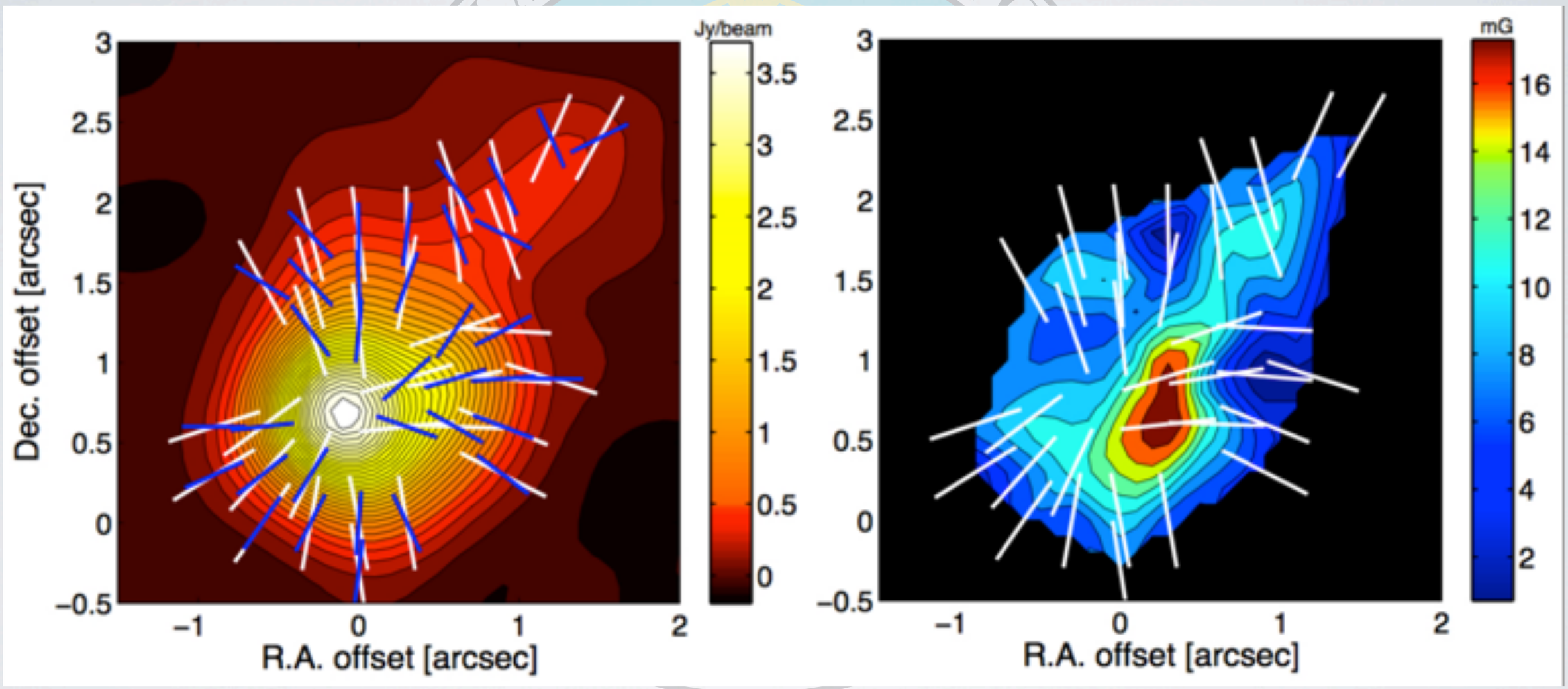


Takahashi et al. (2012)

Magnetic Fields Measurements @ W51 e2

dust continuum @ 345 GHz

B-field strength map

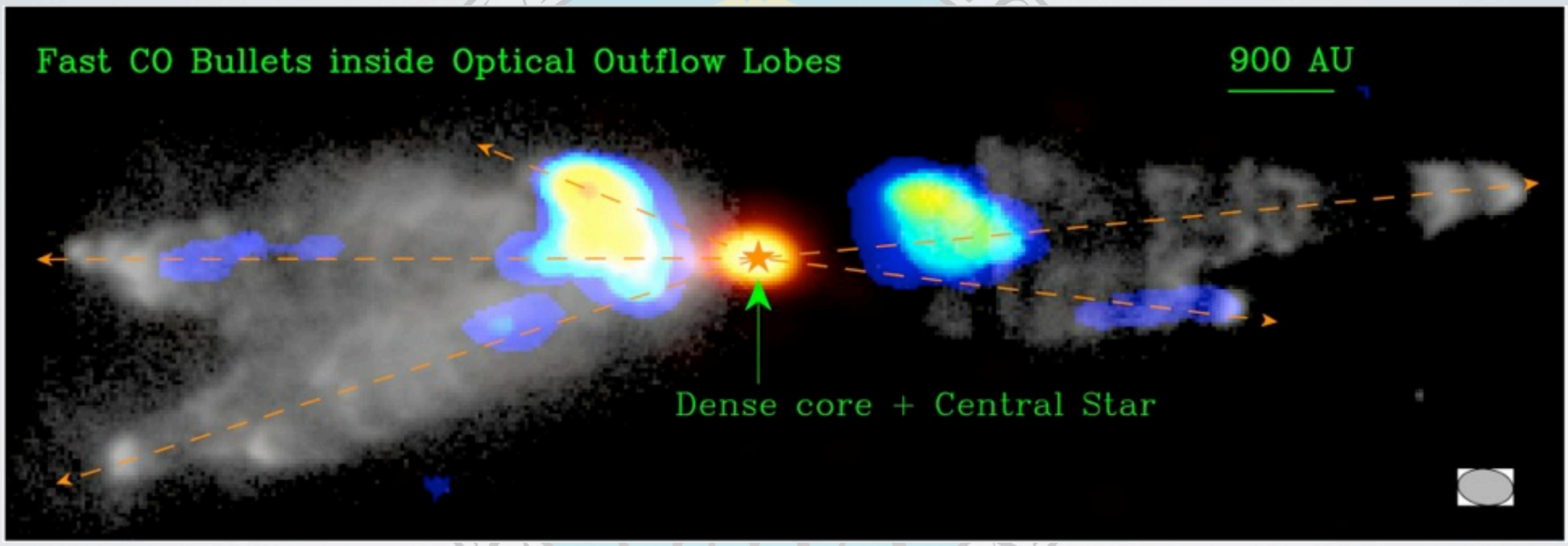


white: B-field direction

blue: intensity gradient

Koch et al. 2012, ApJ, 747, 79

Multiple Fast Molecular Outflows in the PPN CRL 618



Multiple fast molecular outflows with two different dynamical ages oriented along the different optical lobes

Lee C.-F. et al. 2013, ApJ, in press

The SMA is welcome to receive your observing proposals.

http://sma1.sma.hawaii.edu