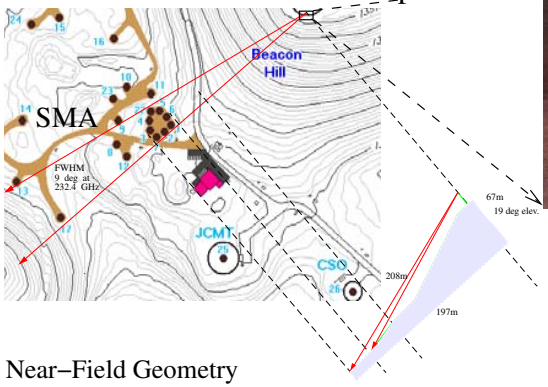
HOLOGRAPHIC ANTENNA VALIDATION MEASUREMENTS

T. K. Sridharan, M. Saito , N. Patel, Harvard–Smithsonian Center for Astrophysics

SMA specification: 12 micron rms for the primary surface

Combination of near–field and celestial measurements.

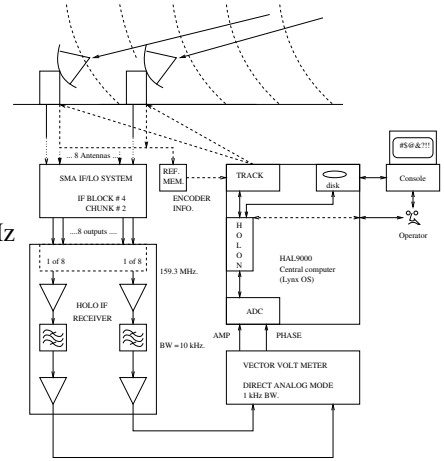
Subaru Telescope



Near–Field Geometry

The 232.4/332 GHz and 692 GHz beacons on Subaru

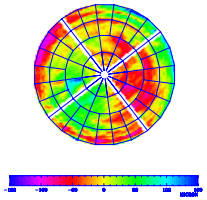
System Block Diagram



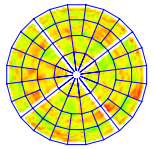
NEAR–FIELD MEASUREMENTS

SURFACE ACCURACY ACHIEVEMENT

rms: 65 micron to12 micron



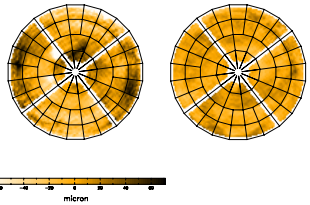
mechanical setting



final holography setting

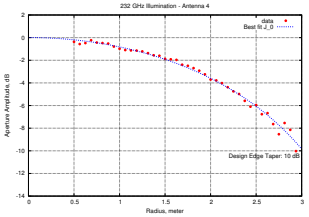
REPEATABILITY

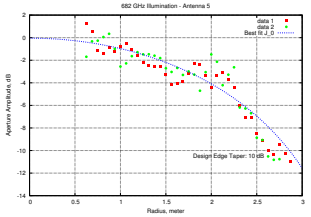
4 yr: 24 micron 1.5 yr: 11 micron



12 transports 2 transports

RADIAL ILLUMINATION PROFILE

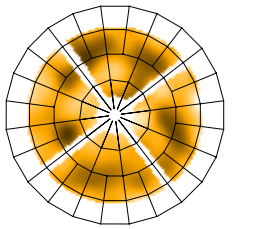


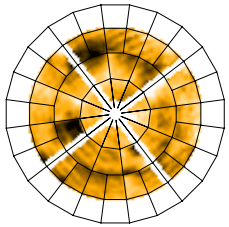


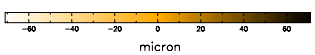
CELESTIAL MEASUREMENTS

Antenna 6

Celestial Near–Field





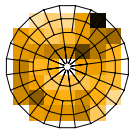


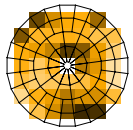
edge effects in 1 pixel outer ring masked

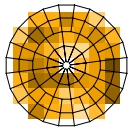
Antenna 2 Antenna 6

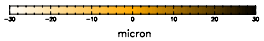
Elevation: 57–34 84–57 84–57

rms: 9 micron 11 micron 8 micron





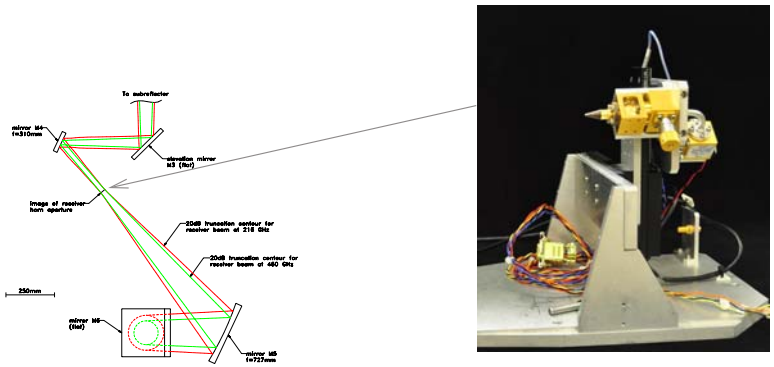


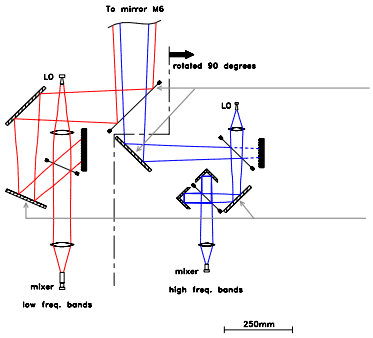


[1]currently at NAOJ, Japan

A VECTOR NEAR–FIELD SCANNER FOR INTER–BAND ILLUMINATION AND BEAM CO–ALIGNMENT

T. K. Sridharan, C. E. Tong, J. Test, R. Christensen, S. Leiker, Harvard–Smithsonian CfA; R. Rao, ASIAA



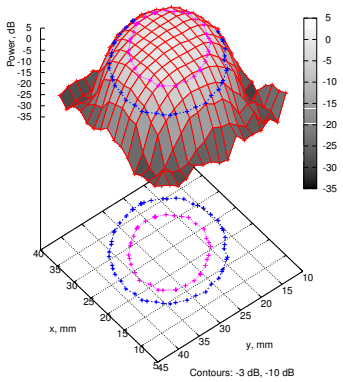


optical elements adjusted:

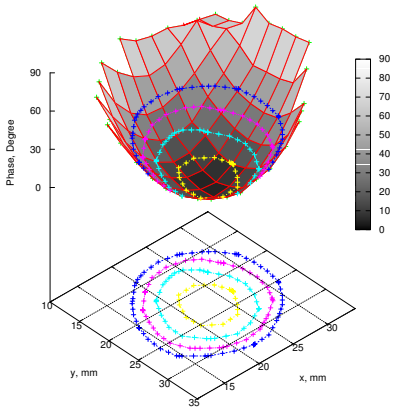
combiner / grid

optics insert mirror

SMA Near Field Scanner, Amplitude



SMA Near Field Scanner, Phase



HOT–CORE, OUTFLOWS AND MAGNETIC FIELDS IN W43–MM1

T. K. Sridharan, R. Rao, K. Qiu, P. Cortes, H. Li, T. Pillai, N. A. Patel, Q. Zhang

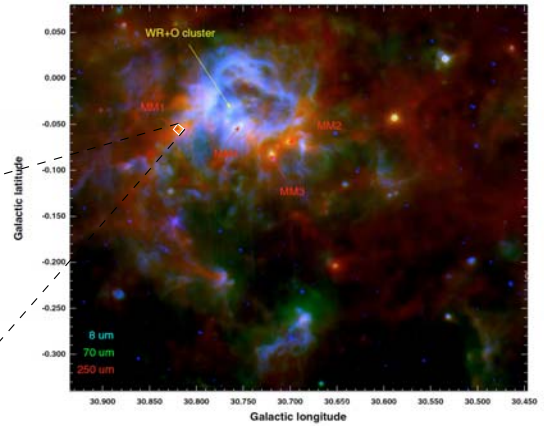
W43–MM1 is the brightest and the most massive core in the W43 mini–starburst region.

Distance ~ 5.5 kpc;

Luminosity ~ few x10^4 L_{sun}

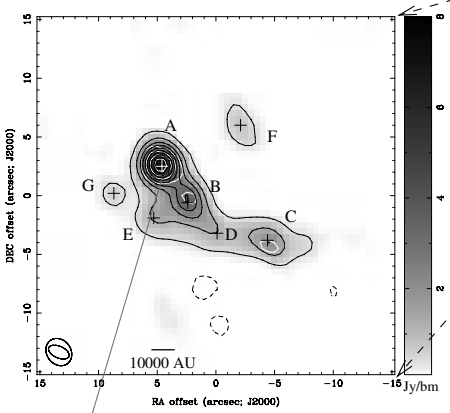
Mass ~ few x10^3 M_{sun}

CONTEXT



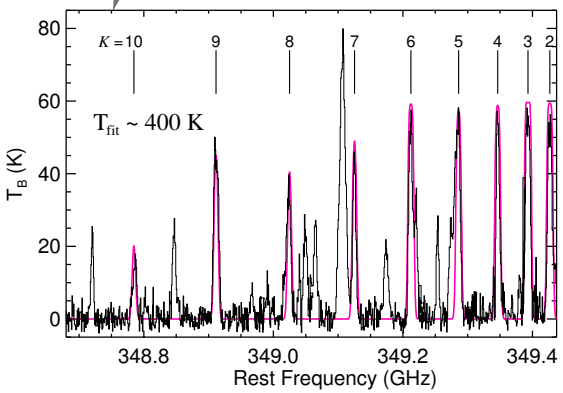
from Bally et al (2010), AA, 518, L90.

345 GHz CONTINUUM AND CH_3CN (19–18)



SMA observations in the 345 GHz band mapped polarized continuum and lines.

CH_3CN (19–18)

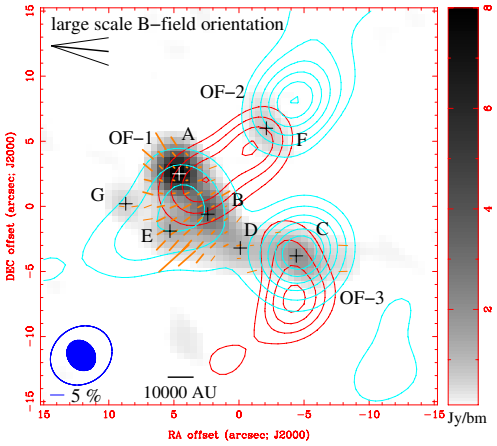


MM1 resolves into multiple massive cores: 1–10 Jy, 100–1000 M_{sun}

MM1–A harbours a hot core with a temperature of ~ 400 K.

11 K–components detected in CH_3CN (19–18)

OUTFLOWS AND B−FIELD



Three massive outflows detected in CO: ~ 10 M_{sun} ; age ~ 10^4 yr.

0.5−15% polarized continuum emission, ordered pattern.

B−field parallel to main outflow

Derived B−field: 6 mG (plane of sky) Mass−to−flux ~ 1

B−field direction varies on small scales, one outflow not aligned to other two. Large scale B−field is not aligned to either the outflow directions or the small scale B−field.

A simple picture of large scale B−field guiding collapse and disk rotation axes (measued by outflows) aligned to B−fields (by magnetic braking) is not supported.