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

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

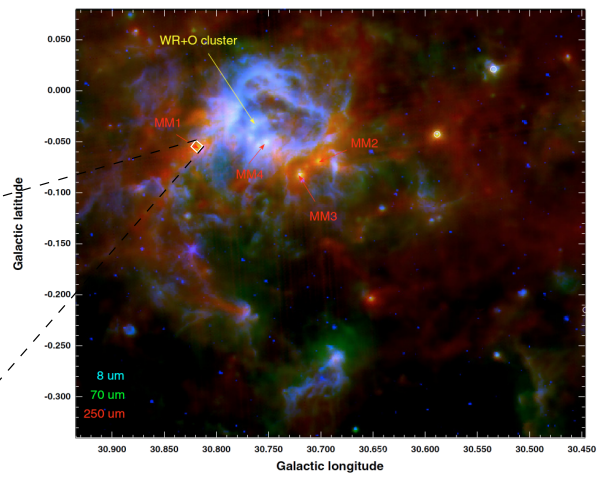
Distance ~ 5.5 kpc;

Luminosity ~ few x10^4 L_{sun}

Mass ~ few x10^3 M_{sun}

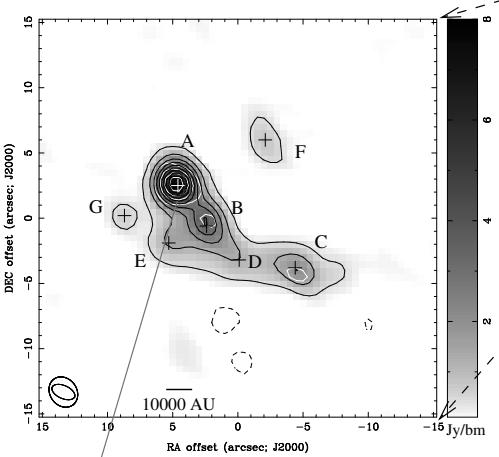
SMA observations in the 345 GHz band mapped polarized continuum and lines.

CONTEXT



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

345 GHz CONTINUUM AND CH_3CN (19–18)



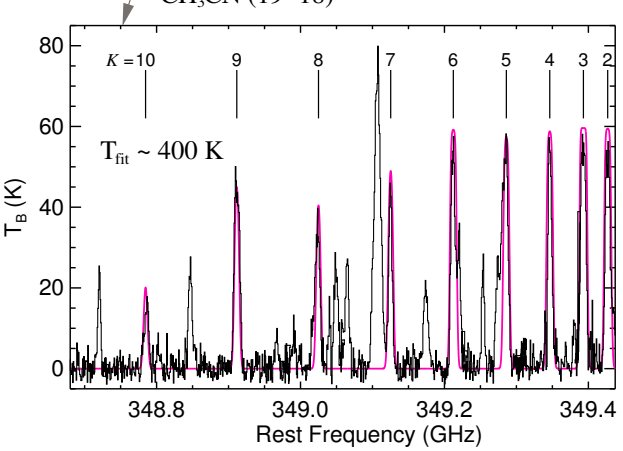
MM1 resolves into multiple massive cores: 1–10 Jy, 100–1000 M_{sun}

Table 1: Continuum Emission

ID	RA (J2000.0)	DEC (J2000.0)	ΔRA, ΔDEC //	Peak, Err Jy/bm	Intg. Jy	Maj //	Min //	PA K	Mass $M_\odot$
A	18:47:47.00	-1:54:26.6	0.1, 0.1	7.9, 0.61	11.5	1.7	1.3	-52	920 - 80
B	18:47:46.86	-1:54:29.7	0.2, 0.2	3.5, 0.52	6.2	2.1	1.9	-63	500
C	18:47:46.41	-1:54:32.9	0.2, 0.2	1.9, 0.26	3.7	2.7	1.7	63	300
D	18:47:46.69	-1:54:32.3	0.2, 0.2	1.1, 0.15	1.9	2.1	1.5	-69	150
E	18:47:47.05	-1:54:31.0	0.2, 0.2	1.2, 0.16	1.6	1.7	0.9	28	130
F	18:47:46.55	-1:54:23.1	0.1, 0.2	0.7, 0.08	1.4	3.4	0.9	22	110

Note. all masses estimated using a temperature of 25 K; core A used 25 & 300 K.

CH_3CN (19–18)



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

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

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

OUTFLOWS AND B–FIELD

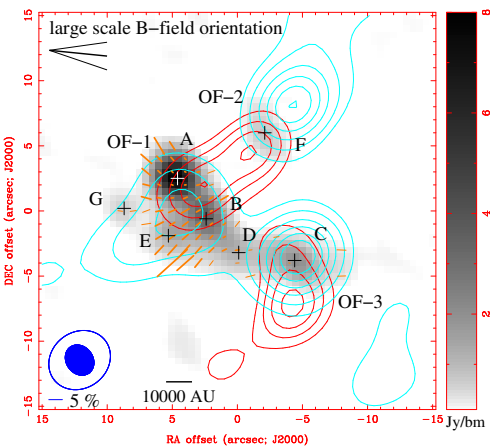


Table 2: Polarization and Outflow Position Angles

region	PA_{mean} deg.	σ_{PA} deg.	$\delta\phi$ deg	Number of pixels
A	-39	14	12	13
B/E	29	17	15	45
C/D	5	8	3	9
All	13	31	30	67
large scale[1]	175	±14		
OF-1	136			
OF-2	135			
OF-3	173			

Note. [1] Dotson et al., 2010

σ – position angle dispersion

δϕ – dispersion after removing measurement error

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.

(full paper published at: Sridharan et al., 2014, ApJL, 783, L31)