Searching for coronal radio emission from *protostars* by VLBI

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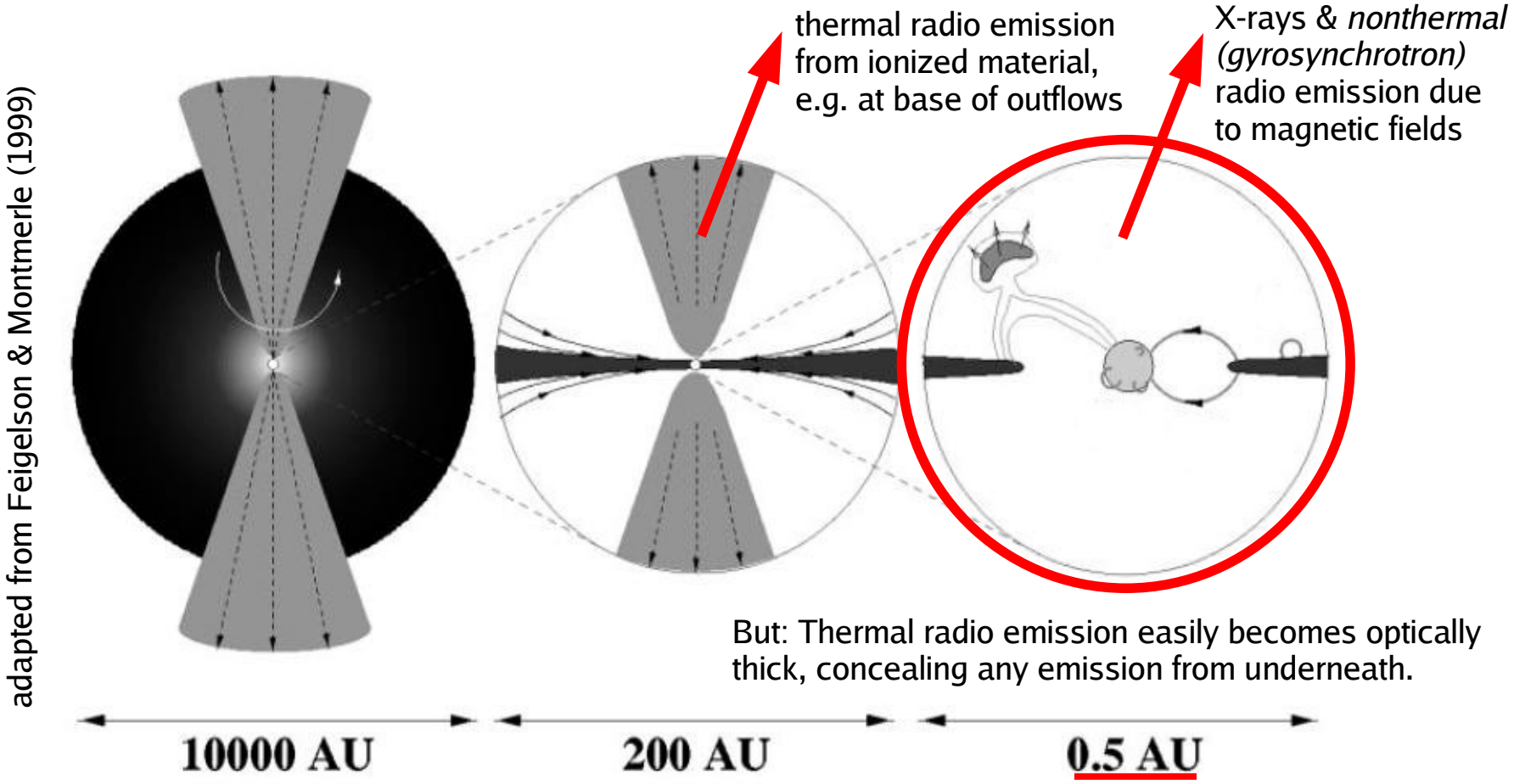
Aim: Probing the innermost gyrosynchrotron radio emission from protostars at sub-AU scales



The High Sensitivity Array (HSA)

Arecibo

Effelsberg

Very Large Array (VLA)

Green Bank

Very Long Baseline Array (VLBA)

Targets:

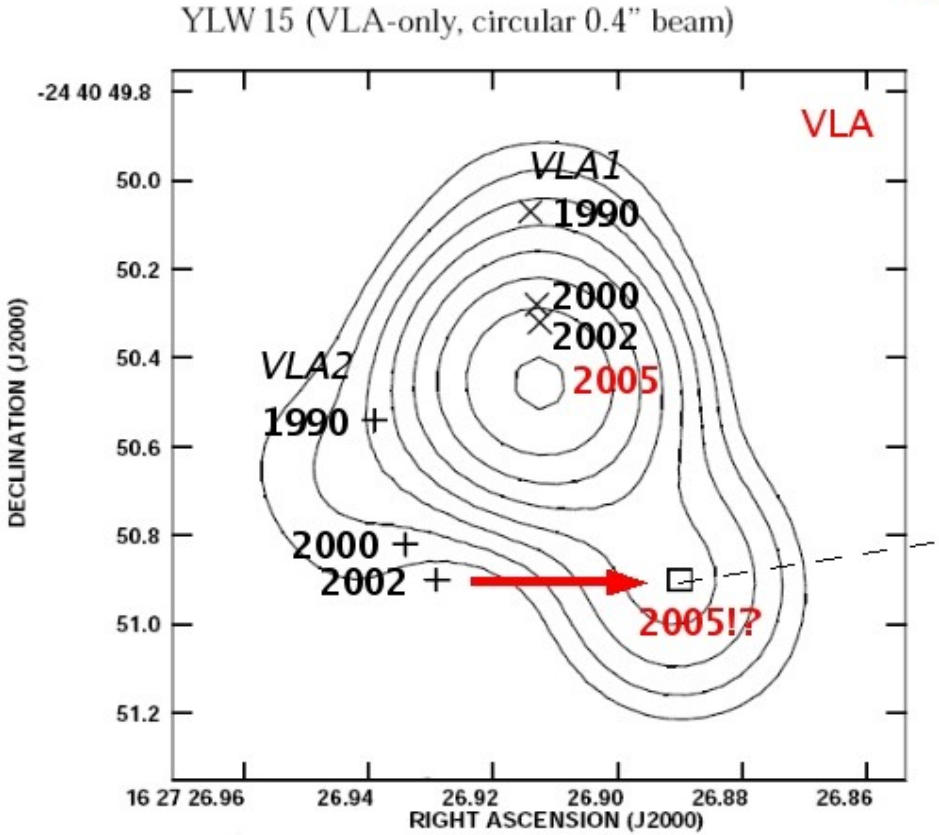
YLW 15	class 0/I binary	(VLBA+VLA+GBT)
EC 95	proto-HAeBe	(HSA)
HL Tau	class I/II transition	(HSA)
LDN 1551 IRS 5	class I binary	(HSA)

Source	Distance	synth. beam (FWHM)		map rms[1]
YLW 15	130 pc	2.9 mas × 0.9 mas, PA −3.6°	0.4 AU × 0.1 AU	15.4 μJy
EC 95	310 pc	2.6 mas × 0.7 mas, PA −7.7°	0.8 AU × 0.2 AU	14.3 μJy
HL Tau	140 pc	1.3 mas × 0.7 mas, PA −6.3°	0.2 AU × 0.1 AU	11.0 μJy
LDN 1551 IRS 5	140 pc	1.3 mas × 0.7 mas, PA −6.1°	0.2 AU × 0.1 AU	11.4 μJy

[1] determined from a Stokes-*I* clean map with 0.2″ side length (1024 × 0.2 mas)

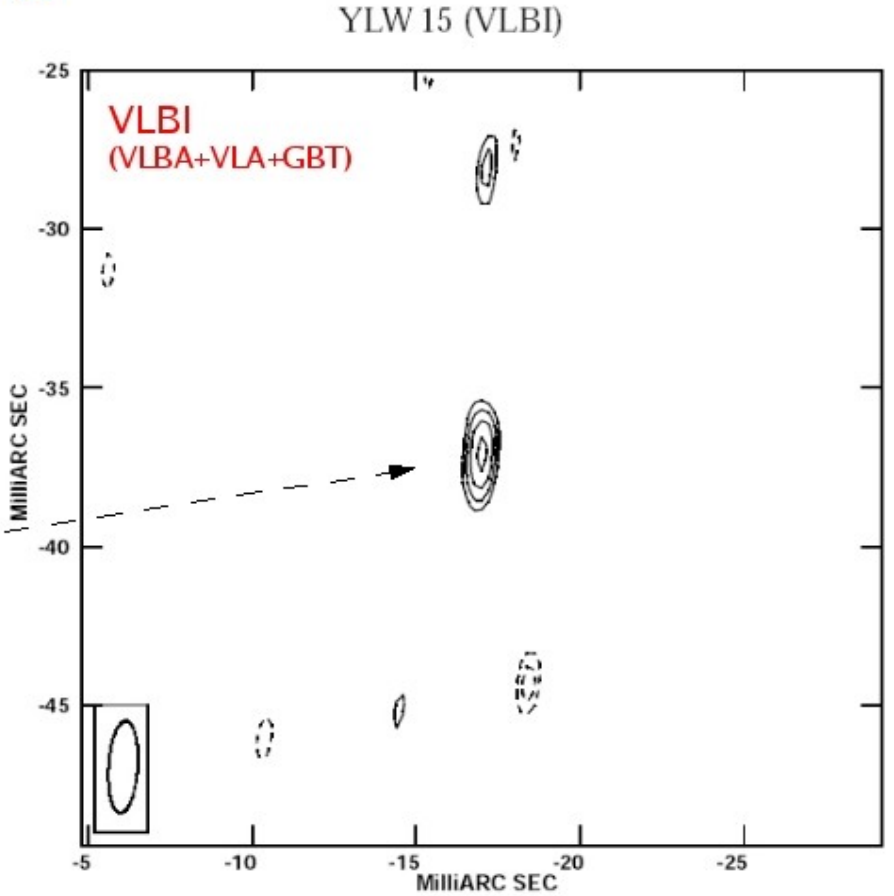
(observations at 8.4 GHz)

YLW 15



a) VLA-only map of YLW 15, restored with a circular 0.4″ beam. The proper motions of the two components as determined by Curiel et al. (2003) are indicated (years 1990, 2000, and 2002 form north to south for both sources) together with the chosen VLBI correlation position (box). The contour lines delineate multiples of 0.1 mJy (~ 4σ), increasing by factors of $\sqrt{2}$ (as explained for Fig. 1).

1990-2002: Curiel et al. (2003), VLA observations



b) Weak source found in the VLBI data close to the putative position of YLW 15 YLW 2 at RA 16h27m26.88875s DEC −24°40′50.937″. The source reaches a significance of ~ 9σ. The contour lines delineate multiples of 3σ, as explained for Fig. 1. The 1σ rms noise level is 15.4 μJy.

Forbrich et al. (2007, in prep.)