λ1.5m Beam Characteristics

SUMMARY

The beams for antennas 8, 17, and 26 are well formed and consistent antenna to antenna.

OBSERVATIONS

- Band: 195.5 MHz / 0.78125 MHz
- Source: CasA (forced point source calibration); 3× sampling
- Date: July 12 (sub-reflector rotated 45° - short side down)
  July 13 (subreflector at default rotation)

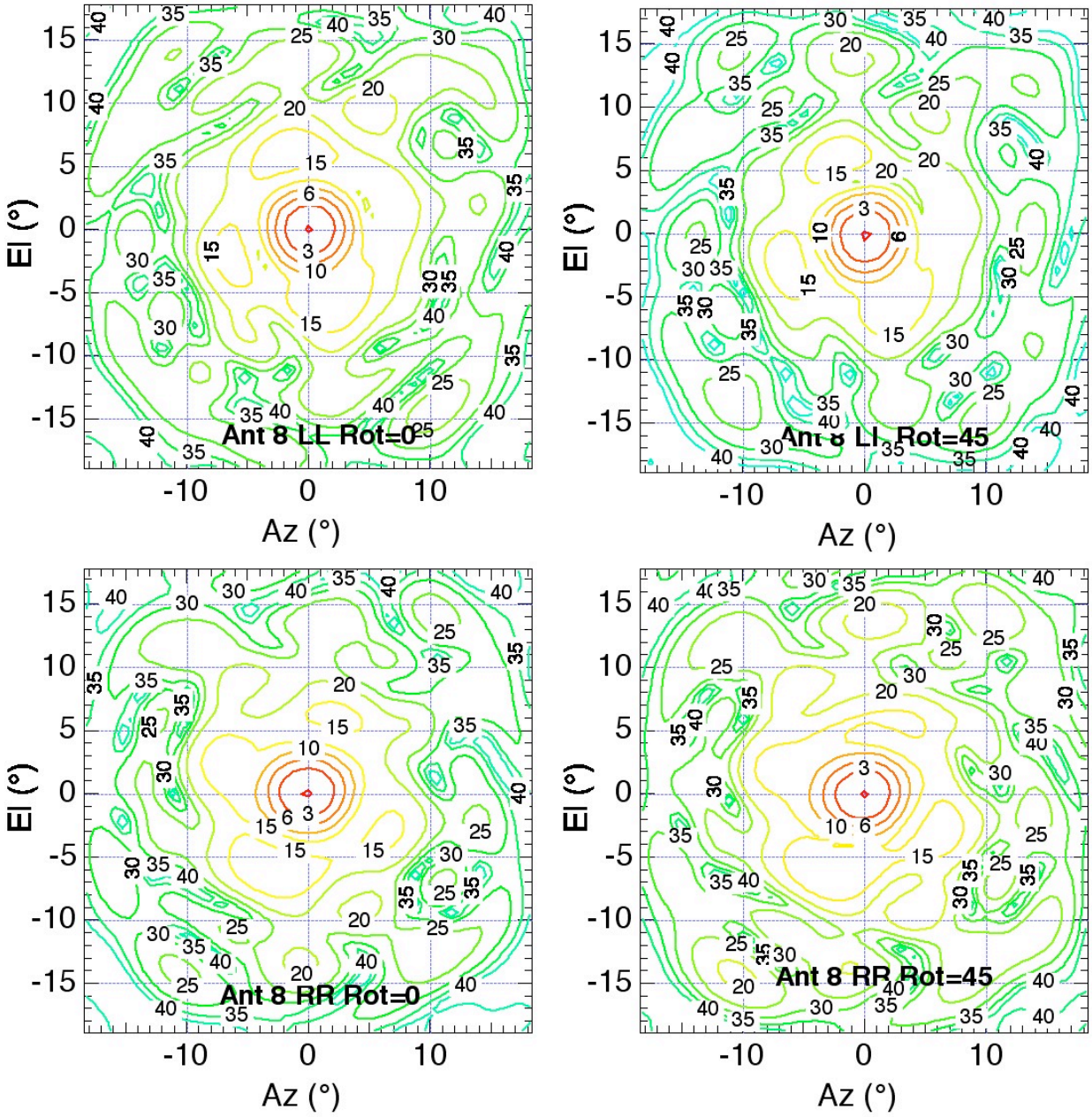

Figure 1—Beam patterns (-dB) for antenna 8 (RR and LL) for two S/R rotations.

RESULTS FOR 1.5M DIPOLES λ/4 FROM THE SUB-REFLECTOR

- Sidelobe structures are down ~ −13 dB (Figures 1, 2), as were P-band sidelobes (Figure 3) before installation of the 1.5m dipoles. NB: Shorting the 1.5m dipoles reduces P-band sidelobes (Figure 3) and improves sensitivity – see www.cfa.harvard.edu/dawn/vla.vhf.2nd.review.05jul25.rev3a.pdf .
- RR and LL beams are substantially similar to each other.
- Sidelobes do not rotate when the sub-reflector does, despite reflector asymmetry.
- Sidelobes exhibit a quadrupole pattern that is static (see above) and not well aligned with the quadrupod legs.
- The beam patterns are noncircular at 10-20% (Table 1), unlike P-band (Table 2).

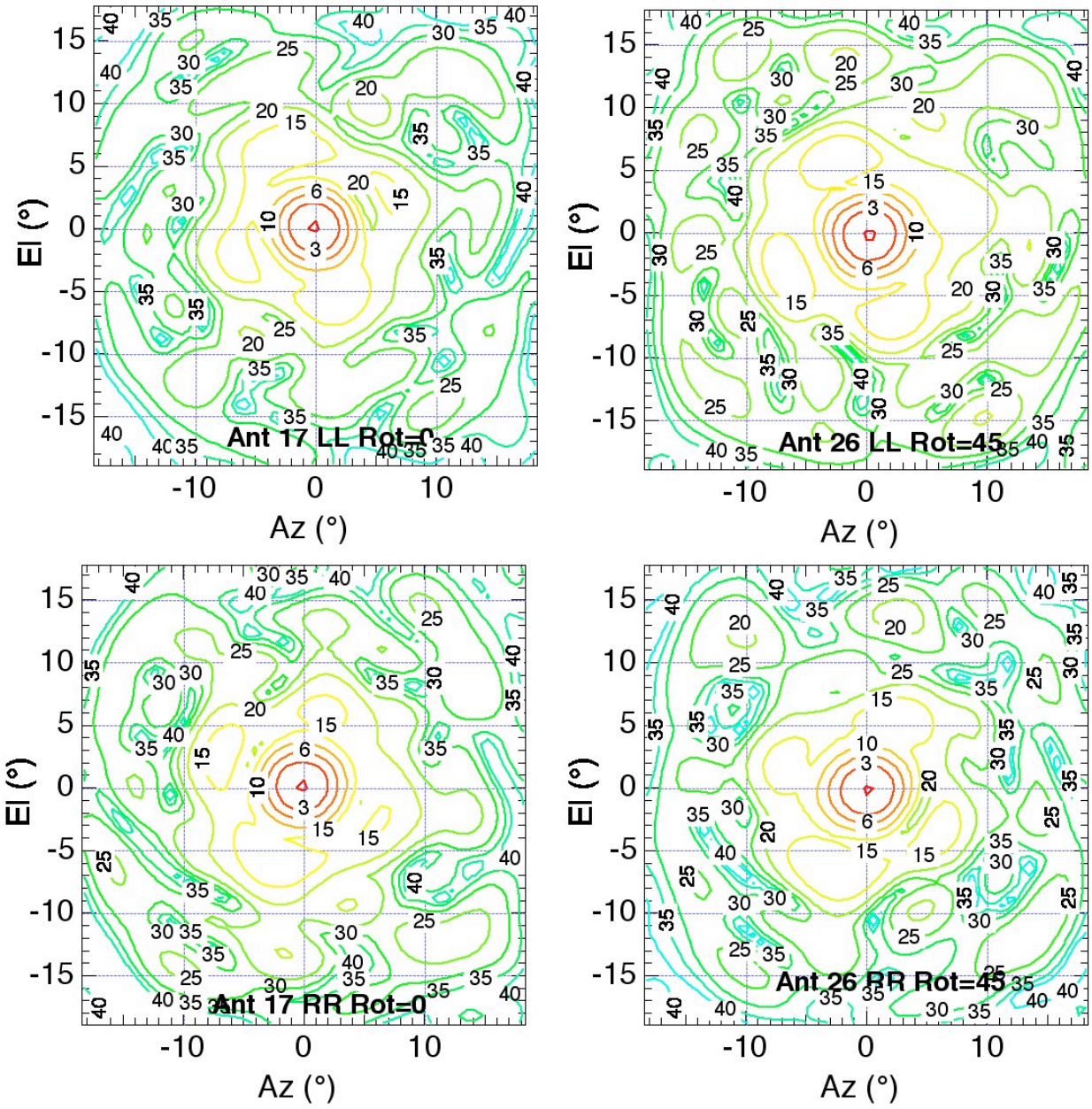

Figure 2-- Beam patterns for antennas 17 and 26 (RR and LL) for different S/R rotation settings.

Table 1: Fitted λ1.5m Beam Characteristics

Ant.	Polz.	S/R	FWHM @ PA (°) *	ΔX (°)	ΔY (°)
8	RR	0°	4.452(6) × 3.707(5) @ 176.4(3)	+0.139(2)	-0.133(2)
8	RR	45°	4.445(6) × 3.694(5) @ 173.3(3)	-0.035(2)	-0.134(2)
8	LL	0°	4.003(6) × 3.741(6) @ 3.7(1.0)	+0.018(3)	+0.125(3)
8	LL	45°	4.019(9) × 3.897(9) @ 159.7(3.1)	-0.209(4)	+0.105(4)
17	RR	0°	4.112(10) × 3.765(9) @ 175.4(1.1)	+0.170(4)	-0.157(4)
17	LL	0°	4.074(6) × 3.734(5) @ 22.3(7)	+0.114(2)	-0.167(2)
26	RR	45°	4.342(12) ×3.794(11) @ 167.5(8)	-0.138(5)	+0.055(5)
26	LL	45°	4.271(13) ×3.866(12) @ 175.1(13)	-0.197(5)	+0.264(6)

(*) 1.2 λ/D corresponds to 4.2°

NB: Earlier documentation (2005 July 25 and 2005 August 3) presented amplitude rather than power maps in reporting beam shape.

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Table 2a: RCP P-band Beam Widths (Shorted 1.5m/No 1.5m)

	PA=90° (*)	**PA=45° (*)**	**PA=0° (*)**	**PA=-45° (*)**
-3 dB	2.39°/2.53°	2.42°/2.53°	2.46°/2.56°	2.42°/2.56°
-6 dB	3.37°/3.61°	3.40°/3.61°	3.44°/3.58°	3.42°/3.61°
-10 dB	4.35°/4.95°	4.46°/4.91°	4.42°/4.70°	4.39°/4.84°

*Position angle defined in terms of elevation (0°) and azimuth (90°)

Results are for antenna 17 and are taken from the August 3 project report, www.cfa.harvard.edu/2holodawn/vla.vhf.2nd.review.05jul25.rev3a.pdf

Table 2b: LCP P-band Beam Widths (Shorted 1.5m/No 1.5m)

	PA=90° (*)	**PA=45° (*)**	**PA=0° (*)**	**PA=-45° (*)**
-3 dB	2.39°/2.42°	2.39°/2.53°	2.46°/2.65°	2.49°/2.56°
-6 dB	3.37°/3.38°	3.33°/3.58°	3.47°/3.75°	3.51°/3.58°
-10 dB	4.28°/4.34°	4.32°/4.77°	4.49°/5.01°	4.53°/4.56°

*Position angle defined in terms of elevation (0°) and azimuth (90°)

Results are for antenna 17 and are taken from the August 3 project report, www.cfa.harvard.edu/dawn/vla.vhf.2nd.review.05jul25.rev3a.pdf

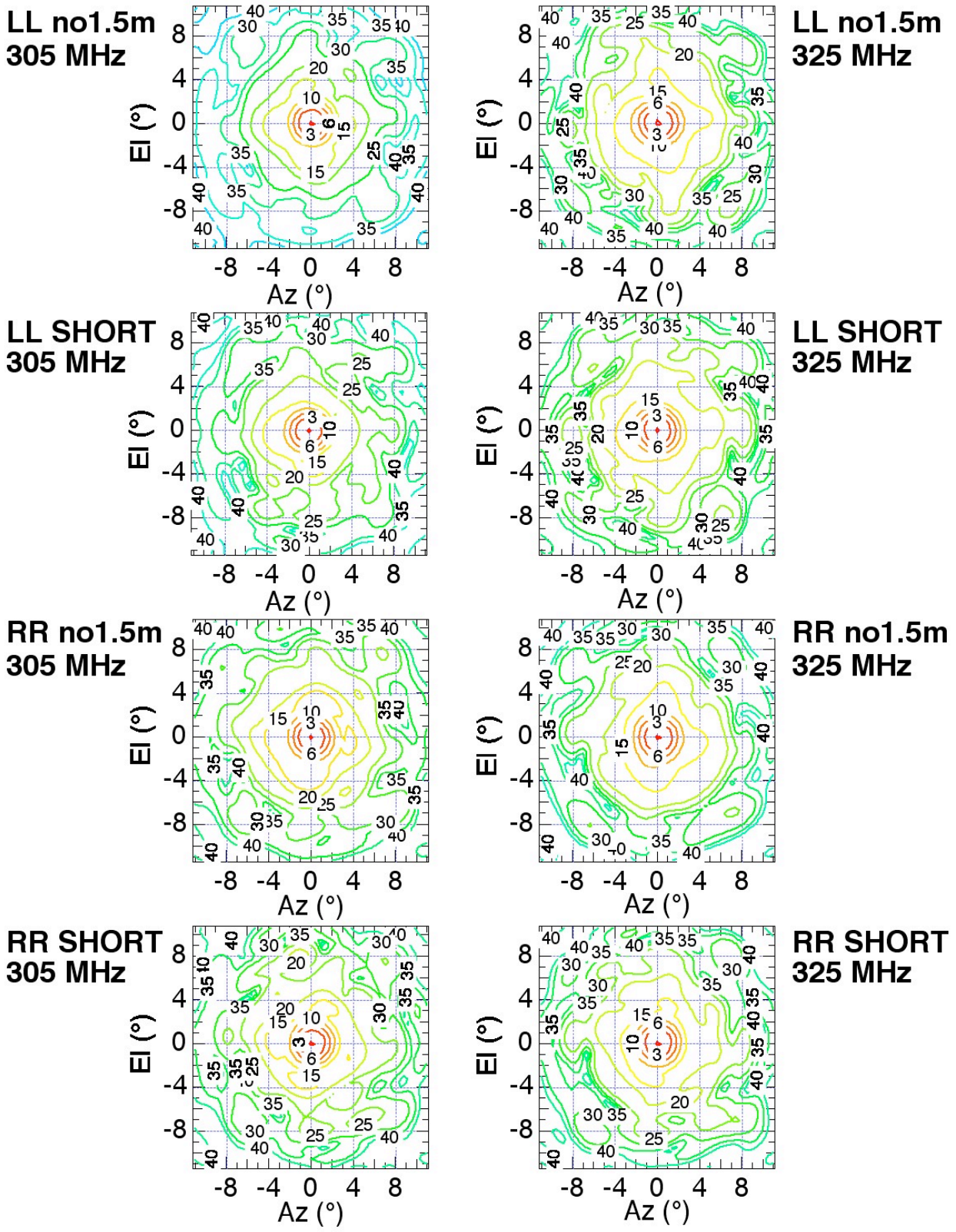

Figure 3—P-band beam patterns for antenna 17 (in -dB) without a 1.5m dipole assembly and with a shorted 1.5m .assembly in place. (Taken from the August 3 project report.)