#92-1

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

HAYSTACK OBSERVATORY

WESTFORD, MASSACHUSETTS 01886

30 November 1992

Telephone: 508-692-4764
Fax: 617-981-0590

TO: Holographers

FROM: Alan E.E. Rogers AEER

SUBJECT: Astigmatism optimization - comparison of radiometry and holography

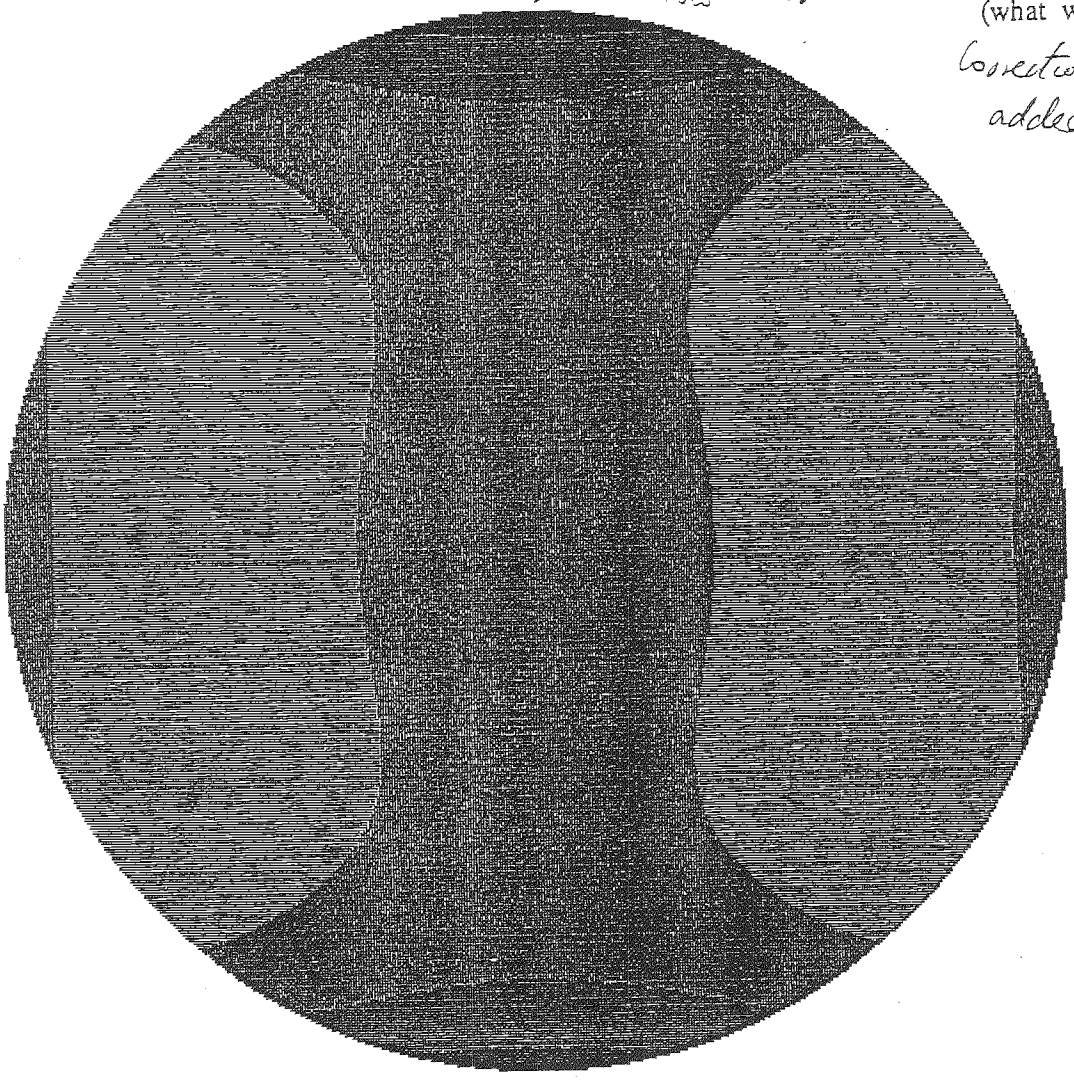
John Ball has reported the optimum setting of the astigmatism in his memo dated 28 September 92, Figure 2. The value for our elevation of 31° is approximately 10 mils of offset - assuming reasonable interpolation/extrapolation of his data.

Holography map 255 was taken at an elevation of 31° with an astigmatism offset of 36 - 9 = 27 mils. This map shows little if any astigmatism but needs to be corrected for the holography feed astigmatism of -15.7 mils (path length or -7.87, 0 degrees in Rich Barvainis' notation - see Figure 4 of memo on feed phase dated 17 April 92) to give a value of 27 - 15.7 = 11.3 mils in very good agreement with the radiometry result. I have neglected any correction for the 43 GHz radiometric feed which is likely to be much smaller than the holography feed in path length units since both feeds probably have comparable astigmatism in units of degrees. The holography feed phases being effectively multiplied by 4 in going from 12 to 43 GHz.

feed has less path obs. than antenna rigged low

Linear Feed
horizontal pol -
- correction
(what would be rigged in?)

Correction to be added to Holography



LOW <-24 -24 -16 -8 0 8 16 24 >24 HIGH
SURFACE DEVIATION IN MILS

Delta_Tilt_Az = -6.4 (mdeg)
Delta_Tilt_El = 0.0 (mdeg)
Delta_Focus = -0.01 (cm)

Amp_cos(2*theta) = 7.87 mils (15.7 phase path) → 2.4 rms
Phi_cos(2*theta) = 90.01 degrees

i.e. add to Holog. −7.87
Richs printouts 0 degrees -

		VERTICAL ASTIG. REMOVED
Phase rms, weighted by 1-0.94(r/60)**2	= 2.31	1.26
Phase rms, weighted by 1-0.68(r/60)**2	= 2.89	1.66
Phase rms, inner, weighted by amplitudes	= 1.25	0.90

Final Phase for Horizontal Polarization (Polarizer Removed)

2 Figure 2 from JAB 28 sept 92