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Foil Position Calibration

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DISCLAIMER

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AGS STUDIES REPORT	
Date(s) of Study: March 11, 1993	**Time(s):** Various
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Subject: Foil Position Calibration	

SUMMARY

Method

The DH115 magnet current was varied to sweep the beam over Foils #2, #3, #4, and #6. The beam intensity was monitored by the C8 PUE. Then with the foils out, a beam sweep was taken with position determined at C6 PUE. In addition, PIP scans were taken at Foil #3 with PUE HC8 and PUE HD2. The measured intensity distribution (with three shots per point) as a function of DH115 current was fitted by an error function for each foil. The center of the linear portion of these curves then measures the foil position (arrows in Fig. 1).

Results

Figure 1A, 1B, 1C, and 1D show the intensity vs. DH115 current and the current at foil location.

Figure 2 shows the above points plotted at the nominal foil positions (also surveyed).

Figure 3 shows the position at PUE HC6 with foils removed.

Figures 4 and 5 are the PIP scans showing the position and angle (at Foil #3) with respect to the equilibrium orbit.

Table I gives a comparison of the foil position as determined from the foil scan and the position as measured by PUE HC6.

Table II gives a comparison of sensitivity to DH115 current from the above, plus the foil angle and position sensitivity from the PIP scans.

Conclusions

The results indicate that the PUEs, PIP scans, and surveyed foil positions are in good agreement, and give a consistent picture of foil position and DH115 sensitivity by several different diagnostic modules.

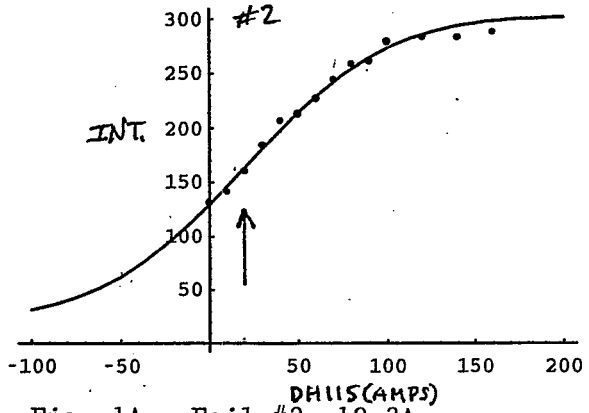


Fig. 1A - Foil #2, 19.3A.

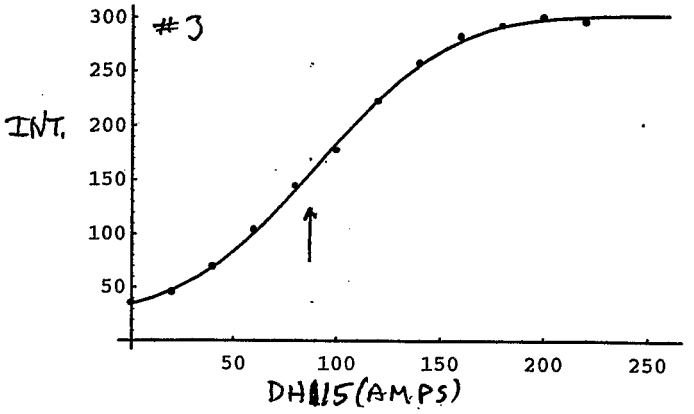


Fig. 1B - Foil #3, 90.6A.

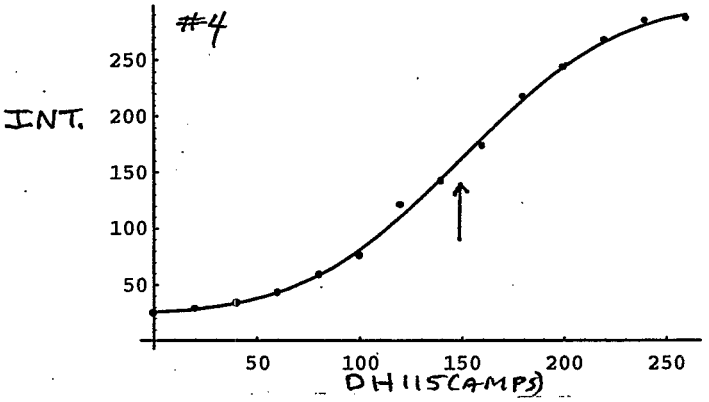


Fig. 1C - Foil #4, 149.6A.

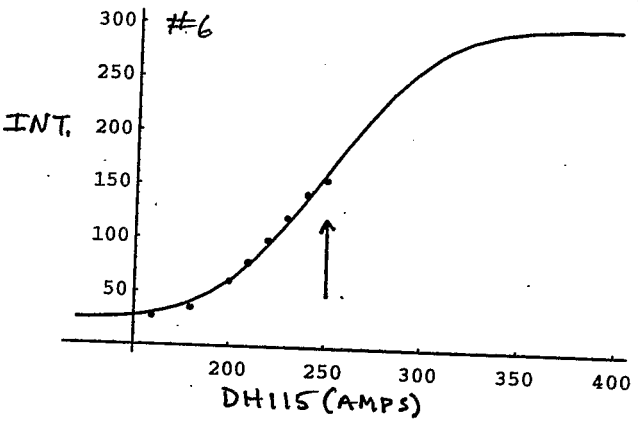
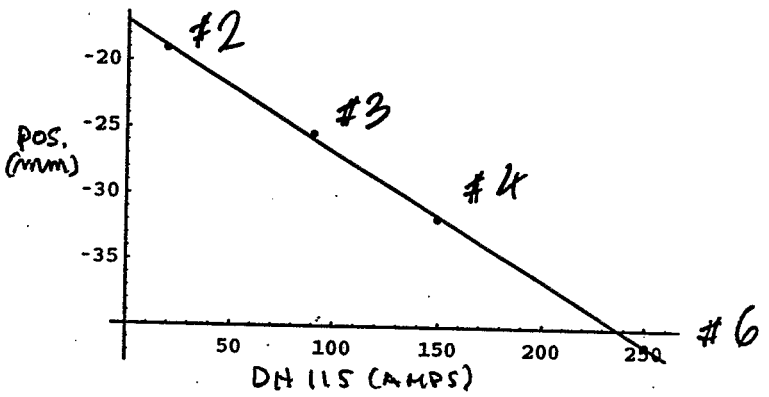


Fig. 1D - Foil #6, 250.3A.



$m = -0.097 \frac{mm}{A}$

$b = -17.01$ mm

Fig. 2 - Foil current at foil plotted vs. surveyed foil positions.

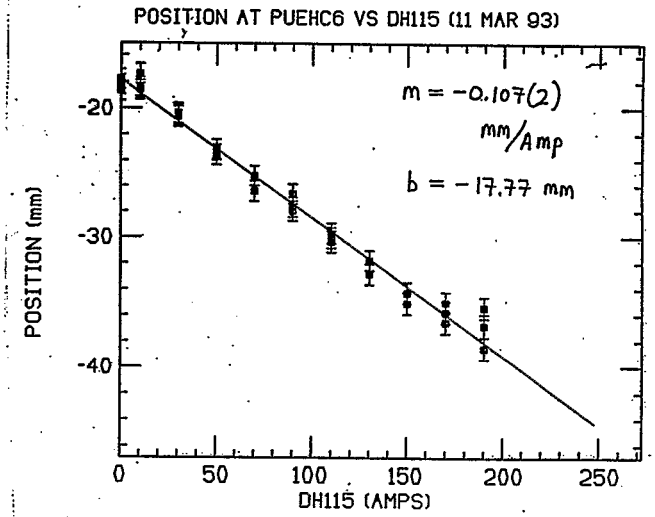
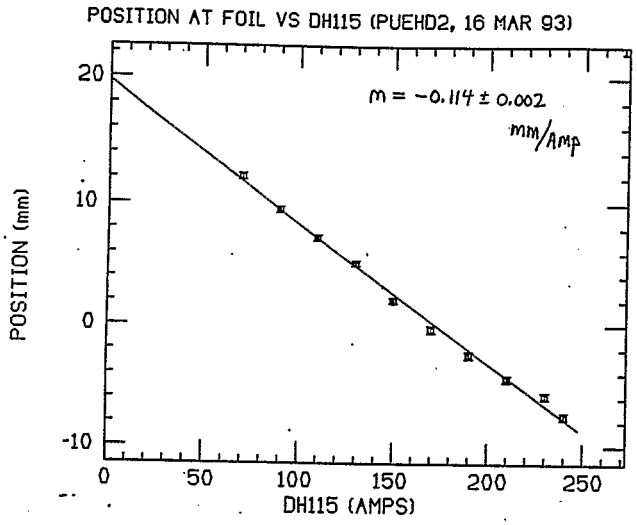


Fig. 3 - Position scan with foils out.



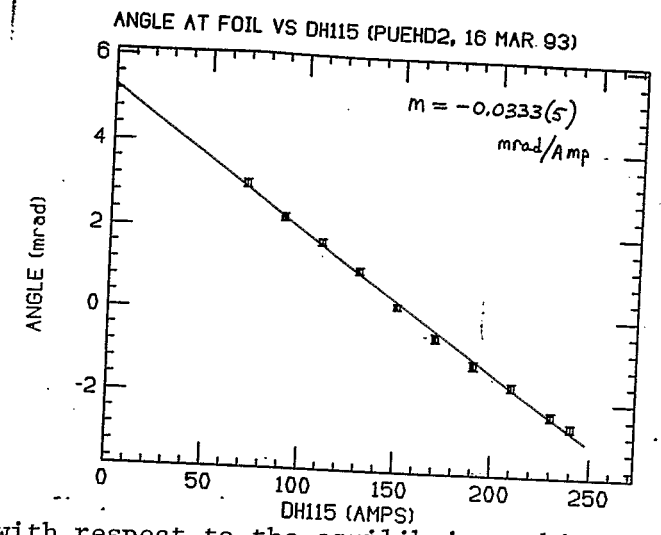
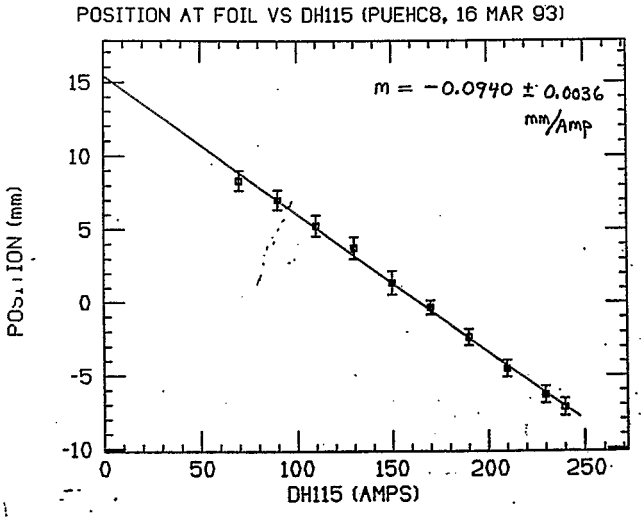


Fig. 4 - Curves show position and angle with respect to the equilibrium orbit at Foil #3 using PUE HD2.



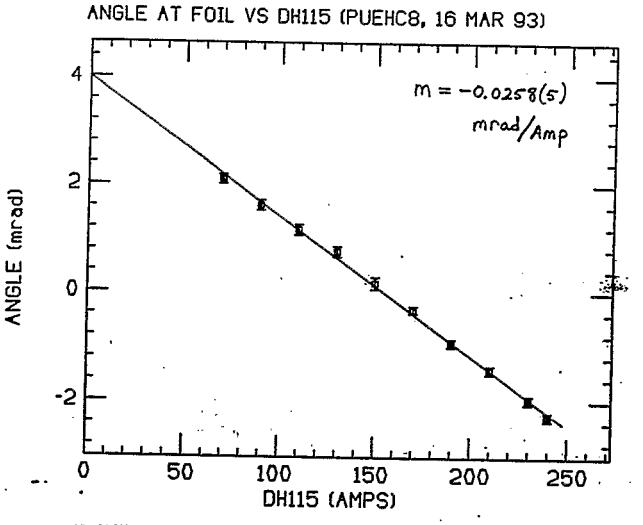


Fig. 5 - Same as Fig. 4, but using PUE HC8 instead of PUE HD2.

TABLE I

FOIL	DH115 FOIL SCAN CURRENT FROM ERROR FUNCTION FIT	POSITION OF BEAM AT FOIL SURVEYED LOCATION (Nominal)	POSITION OF BEAM FROM PUE HC6
#2	19.3 A	- 19.05 mm	- 19.8 mm
#3	90.6 A	- 25.4 mm	- 27.5 mm
#4	149.6 A	- 31.75 mm	- 33.8 mm
#6	250.3 A	- 41.275 mm	- 44.6 mm

TABLE II

	SENSITIVITY	
	$\Delta X/\Delta I$ mm/amp	$\Delta\theta/\Delta I$ mrad/amp
PUE HC6	- 0.107	
PUE HC8	- 0.094	- 0.0258
PUE HD2	- 0.114	- 0.0333
Foil Scan	- 0.097	