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FIELD MEASUREMENTS ON 3-FT B2 REFERENCE MAGNET

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The magnetic field at a point inside the gap of a 3-ft B2 reference magnet has been measured as a function of current. A NMR probe was used to sense the field up to approximately 8.6 kG. In addition, a Hall probe was used to sense the field up to 19.6 kG (the maximum output of the Transrex power supply was reached at this field).

The NMR probe was located at a point near the center of the magnet well inside the gap (14 in. from the lead end of the magnet). The Hall probe was positioned near the NMR probe. Before any measurements were made the magnet (which was powered in series with a 20-ft B2 magnet) was pulsed several times to 6800 A. The data are shown in the table below. A correction has been made to the Hall probe data by taking the difference between the NMR and Hall probe measurements at the 7-kG level.* Linearity curves for the Hall probe were not available; however, the Hall elements as supplied by the F. W. Bell Company are typically linear to within ±0.1% over the range 0 to 30 kG. Two separate data sets were taken, labeled below as runs 1 and 2. The accuracy of the field measurements is ±0.1%. The current is accurate to ±0.05%.

*The per cent difference at this field was 0.44.

Table. Field at a Point Inside 3-Ft B2 Reference Magnet.

Current (A)	Run	NMR Field (kG)	Hall Field (kG)
0		--	0.010
101.2	(2)	--	0.402
499.7	1	1.961	--
506.5	2	--	1.984
700.5	1	2.746	--
800.1	1	3.139	--
900.1	1	3.530	--
996.2	2	--	3.904
1000.4	1	3.927	--
1200.6	1	4.715	--
1502.5	2	--	5.897
1800.3	1	7.064	7.064
1999.0	2	--	7.840
1999.8	2	7.8416	7.841
2201.3	1	8.632	8.637
2201.4	2	8.634	8.635
2400.0	1	--	9.414
2499.0	2	--	9.802
2500.0	1	--	9.805
2600.3	1	--	10.198
2819.5	1	--	11.063
2996.5	1	--	11.748
3001.0	2	--	11.769
3202.0	1	--	12.562
3507.0	1	--	13.731
3529.2	2	--	13.827
3997.5	2	--	15.579
4000.0	1	--	15.595
4489.2	2	--	17.255
4496.0	1	--	17.289
4995.0	1	--	18.769
4997.7	2	--	18.755
5350.0	2	--	19.683

Equipment List

Magnet: B2 · 3 · 7, Series Inductance 0.425 mH, Q = 1.370 at 1 kHz; ALPHA NMR Gaussmeter Model 3193, NAL #9086; F. W. Bell Gaussmeter Model 811AR, NAL #10864; F. W. Bell Hall Probe Model HTL8-0618 Serial #78772 with extension cable Serial #78772; magnet measurements group standard shunt 100 A/mV; DVM (to read shunt) DANA Model 5900, NAL #12837.