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SUBJECT

Laser Optoacoustic Spectrometer Project
Rough Calibration of Phase I Helmholtz Coil System

NAME

D.H. Nelson

DATE

March 19, 1982

The "Helmholtz" coil design for the coil pair tested is described in MT 314. This note presents the preliminary tests and calibrations completed by Magnetic Measurements Engineering before we loaned the equipment to Shu-Shia Chen.

Figure 1 shows the hardware loaned to Shu-Hsia Chen for studies related to the Laser Optoacoustic Spectrometer Project. Table I lists specific equipment and some significant parameters.

After adjusting the Gaussmeter's zero and calibration controls, we collected the data summarized in Table II.

On March 17th, Dr. Shu-Hsia Chen reported successful operation of the hardware provided. She does not plan to operate at higher (than ~250 Gauss) fields as the coil temperature masks the effect of magnetic field.

Distribution

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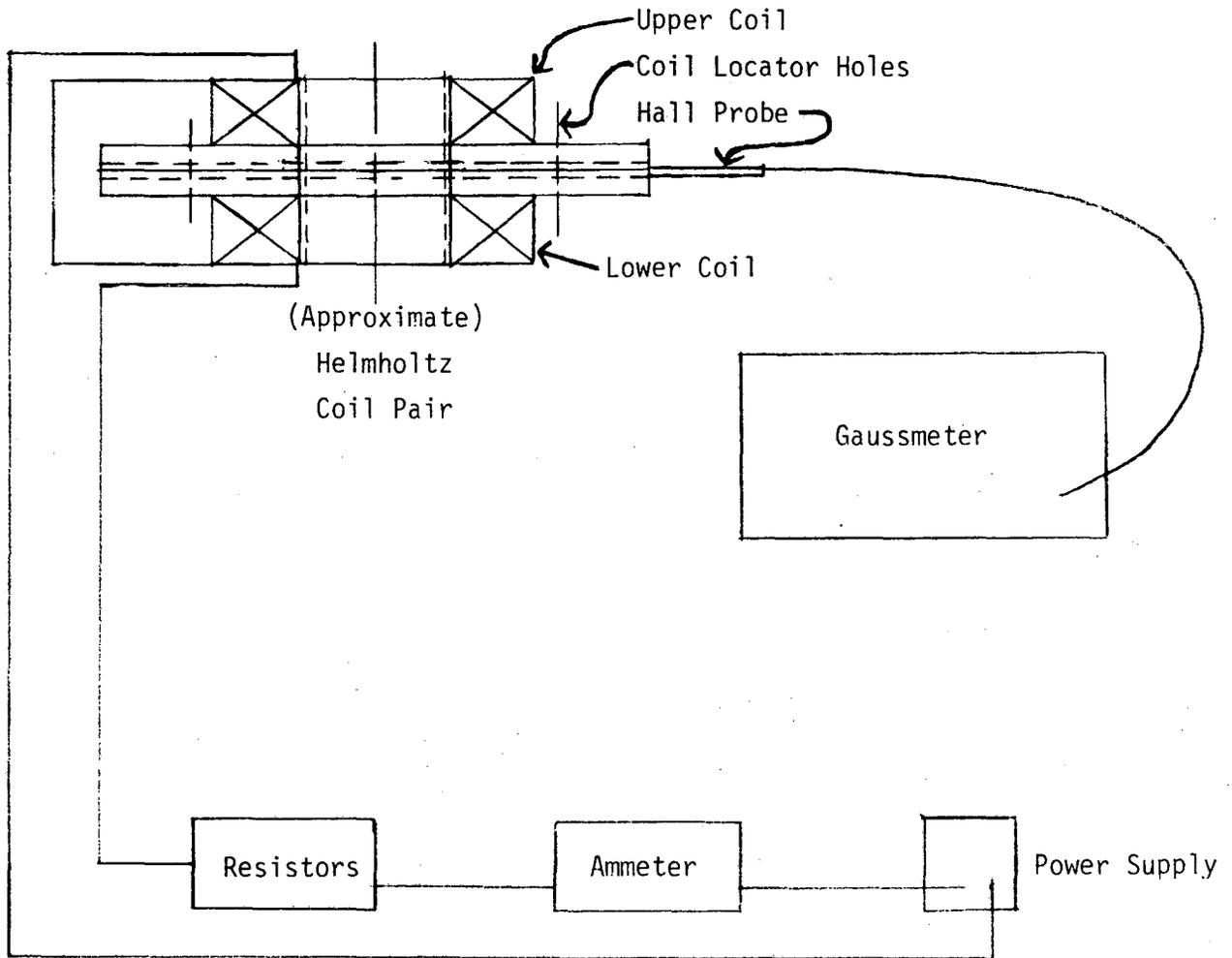


Figure 1 Circuit for Energizing Helmholtz Coil and for Measuring Resultant Field

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MT 315

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3 OF 3

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Helmholtz Pair

Coil Form MT 314, Figure 1

Coils (2 each) 350 Turns AWG No. 24 Heavy Formvar
 Mean Radius, $a = 0.016$ m
 Room Temperature Resistance $\sim 7.0 \pm 0.3 \Omega$

Locator Holes 4 - 3/16" D Holes (See MT 314, Figure 1)

Resistors (Current Limiting) None Required for Phase I

Ammeter	Keithley Mod 172A	S/N 14098
Power Supply	Lambda Mod LP520FM (5 A/10 V)	S/NB14168
Gaussmeter	F.W. Bell Mod 620 Probe Mod HTJ4-0608 Shield Mod YA111	AEC No. 501586 S/N 150289 No S/N

TABLE I Equipment List

Helmholtz Coil-Pair		Magnetic	Normalized
Series Current		Induction	Magnetic
I_0	E_{load}	$B_z(z=0)$	Induction
(A)	(V)	(G)	B_z/I_0
			(G/A)
+1.0	6.8 ± 0.1	177	177
+1.5	>10	260	173
-1.0	7.1	177	177
-1.47	>10	256	174
(Measured Values $\sim 14\%$ Low @ 1.5 A)			
Design Estimate	1.53	300	196

TABLE II Rough Calibration of Helmholtz Coil Pair

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