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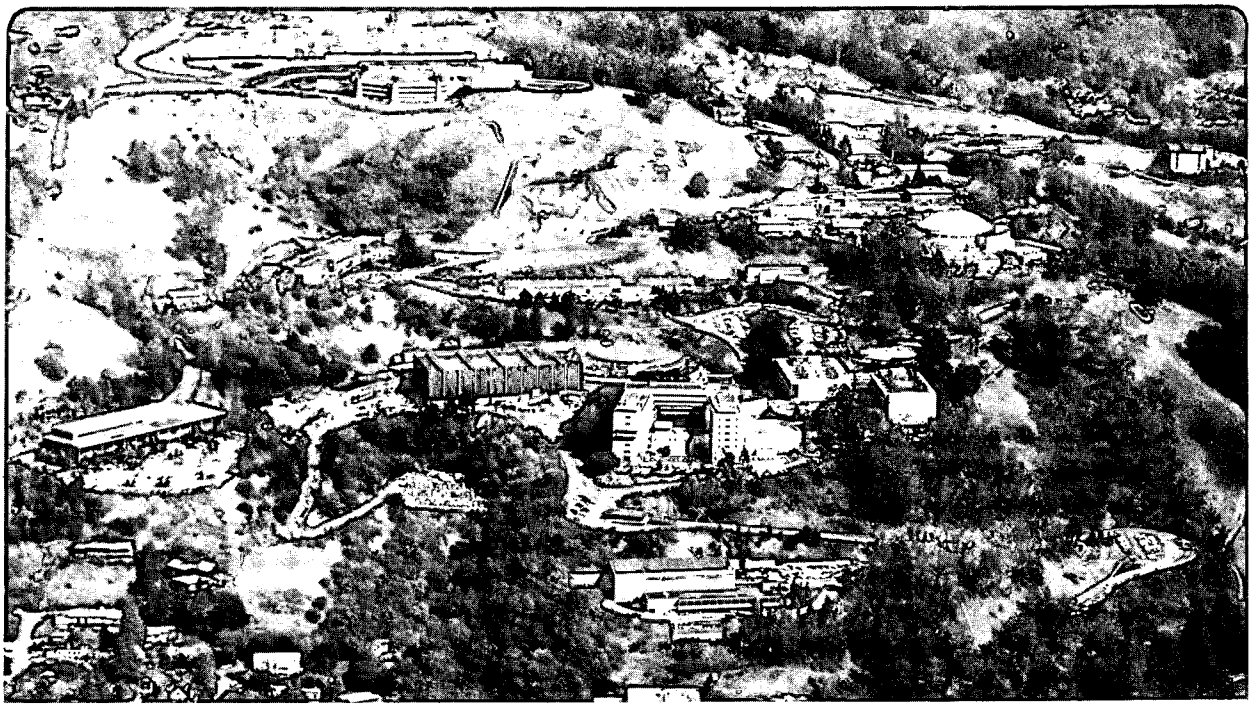

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ENGINEERING NOTE

CODE	SERIAL	PAGE
SC0120	M5428	1 OF 1

AUTHOR	DEPARTMENT	LOCATION	DATE
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PROGRAM – PROJECT – JOB

STOCHASTIC BEAM COOLING

CALCULATIONS, GENERAL

TITLE

STEERING MAGNETS

This note describes the steering magnets installed in December at Fermilab to deflect the 200 MeV proton beam associated with the cooling ring. Another note by LBL's Don Nelson describes measurements:

Type	--	C type, solid core
Design	--	Christoph Leemann, Dick Reimers
Fabrication	--	LBL Shops
Power supply	--	FNAL, on hand
Beam energy	E	200 MeV
Particle type	--	Proton
Beam Stay Clear	BSC	2.75 inch DIA (= 69.8 mm)
Bend angle	θ	0.5 milliradians
Beam stiffness	B_p	2.1 Tesla meters (=21 kilogauss meters)
Gap field = $\theta B_p / L_{eff}$	B_g	~ 37 gauss
Gap @ beam C/L	g	6.875 inches
Efficiency est.	η	~ .95
Field quality inside BSC	$\lvert\Delta B/B\rvert$	.024 total over 7 cm. distance
Core length @ beam C/L	--	~ 9.3 inches
Core Weight	--	17 lbs.
Amp turns	NI	540
No. coils	--	1
Turns	N	108
Current	I	5 Amps D.C.
Coil resistance	R	~ .24 Ω
Voltage drop/coil	V	~ 1.20 volts
Conductor O.D.	d	.114 inch (#9 copper w/Formvar)
Power/magnet	P	~ 6 watts
Cooling type	--	Air convection
Maximum coil temperature	--	~ 41 deg. C (est)
Heat Loss rate	--	.06 watt/in.^{2}
Temperature rise	--	~ 21 deg. C (est)
Measurement		Don Nelson, Bob Main

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