

MAGNET DIVISION NOTES

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SINGLE LAYER RHIC ALTERNATIVE DESIGNS

R.C. Fernow

As part of the RHIC design studies we have considered single layer alternatives for the dipole magnets. The coil cross sections presented in Table I assume a fully keystoned cable with CBA dimensions, and a single value for the current (i.e., no grading). Design RHIC-9 has a 75 mm aperture, whereas RHIC-13 has an aperture of ~ 5 inches. The coil radii for RHIC-13 are the same as for the CBA inner coil, so that if this design were adopted some of the CBA tooling could still be used. Both designs achieve reasonable field quality with 4 conductor blocks.

TABLE I
RHIC COIL CROSS SECTIONS

Design	Block	N	ϕ_{st}	ϕ_{end}	r_i (cm)	r	r_o (cm)	R (cm)
RHIC-9	1	15	0.07°	28.91	3.772	4.112	4.554	5.057
	2	8	31.50	46.88	.188	.490		
	3	5	53.62	63.23	.961	.777		
	4	2	73.93	77.77	.384			
RHIC-13	1	24	0.07°	27.68	6.566	7.348	7.851	
	2	13	29.89	44.85				
	3	9	50.89	61.24				
	4	4	71.86	76.46				

TABLE II
MULTIPOLES, $b_n \times 10^4$ @ r_p

	RHIC-9	RHIC-13
r_p (cm)	2.5	4.4
b_2	- .02	0.0
b_4	- .01	0.0
b_6	- .00	0.0
b_8	.04	0.0
b_{10}	.08	0.1
TF(G/A)	7.64	8.11