

## RHIC Aperture Requirements

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RHIC APERTURE REQUIREMENTS

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APERTURE REQUIREMENTS (Au)

$\gamma$	$N_B = 1.2 \times 10^9$				$0.6 \times 10^9$		
	$\epsilon/\pi$	$\delta$	S (eV.sec)	$\sigma_L$ (m)	$\epsilon/\pi$	$\delta$	S (eV.sec)
	$\times 10^{-6}$	$\times 10^{-3}$			$\times 10^{-6}$	$\times 10^{-3}$	
5	70	1.0			49	0.93	
12.5 operation	34.5	1.22		1.25	25	1.03	
12.5 injection	10	0.53	0.2		10	0.53	0.2
26.4 transition	10	4.2 *	1.0				
100	18.4	0.79		1.15	15	0.59	

\* LMV,  $h = 6 \times 57$ , 30 sec acceleration time

Physical aperture requirements (operation at  $\gamma = 12.5$ )

$$= \pm \sqrt{6} \left( X_p \delta + \sqrt{\frac{\epsilon \beta}{\pi \gamma}} \right)$$

$$= \pm \left( x_{c.o. @ \Delta p/p = \pm 3 \times 10^{-3}} + \sqrt{6} \frac{\epsilon \beta}{\pi \gamma} \right) \quad (\text{J. Claus})$$

Good field aperture requirement

$$= \pm \left( \sqrt{6} X_p \delta + \sqrt{\frac{\epsilon \beta}{\pi \gamma}} \right)$$

Other aperture requirement definitions

$$\pm 6 \left( (X_p \delta)^2 + \frac{\epsilon \beta}{6\pi\gamma} \right)^{1/2} \quad (\text{A. Ruggiero})$$

$$\pm \left( 2.64 (X_p \delta + \sqrt{\frac{\epsilon \beta}{6\pi\gamma}}) + 1.2 \text{ cm} \right) \quad (\text{HERA-p})$$

$$\pm \left( 8.4 \left( (X_p \delta)^2 + \frac{\epsilon \beta}{6\pi\gamma} \right)^{1/2} + 1.2 \text{ cm} \right) \quad (\text{HERA-e})$$

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RHIC MAGNET APERTURES  
for Luminosity Calculations  
(mm)

	Good field		Aperture	
	Arc	Arc	Arc	Low $\beta$ Insertion
RHIC-3 in	$\pm 25.4$	$\pm 32$	$\pm 70$	
SSC	$\pm 20$	$\pm 27$	$\pm 27$	
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Required* - Au				
@ 12.5 operation	$\pm 18$	$\pm 36$	$\pm 104$ vert.	$\pm 86$ horiz.
@ 12.5 injection	$\pm 8$	$\pm 18$	$\pm 56$	
@ transition	$\pm 19$	$\pm 25$	$\pm 39$	
@ 100 operation	$\pm 6$	$\pm 10$	$\pm 27$	

\*RHIC-2 lattice