

## Beam Dimensions In RHIC

J. Claus

March 1984

Collider Accelerator Department  
**Brookhaven National Laboratory**

**U.S. Department of Energy**

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No. DE-AC02-76CH00016 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

BEAM DIMENSIONS IN RHIC

J. Clausen

Brookhaven National Laboratory

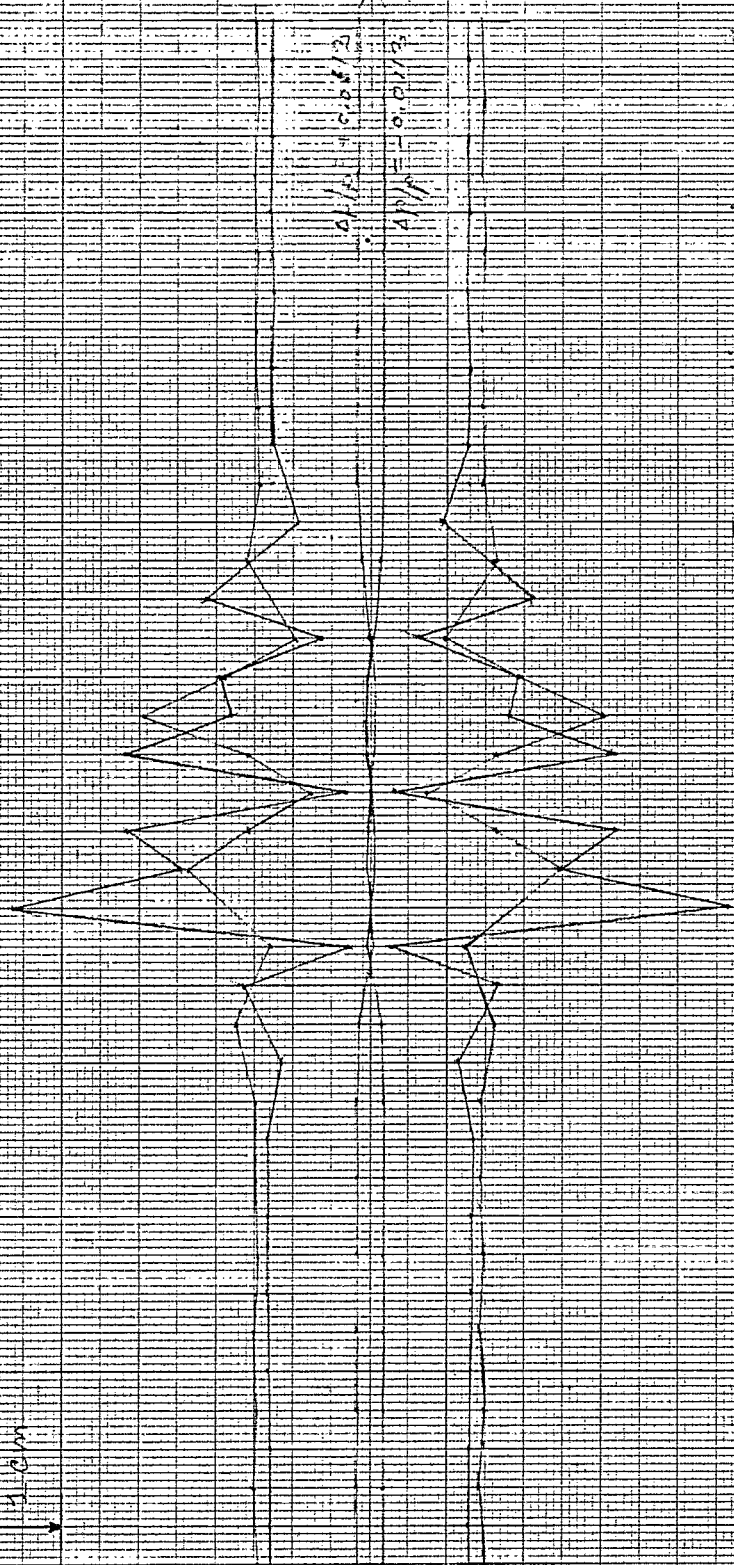
March 10, 1984

Inner Arc

Q<sub>8</sub> Q<sub>7</sub> Q<sub>6</sub> Q<sub>5</sub> Q<sub>4</sub> Q<sub>3</sub> Q<sub>2</sub> Q<sub>1</sub> Q<sub>0</sub>

Outer Arc

1 cm



Beam dimensions at input

$$\gamma = 12.5$$

$$E\gamma = \frac{1}{6}$$

$$\Delta P/P = 0.012$$

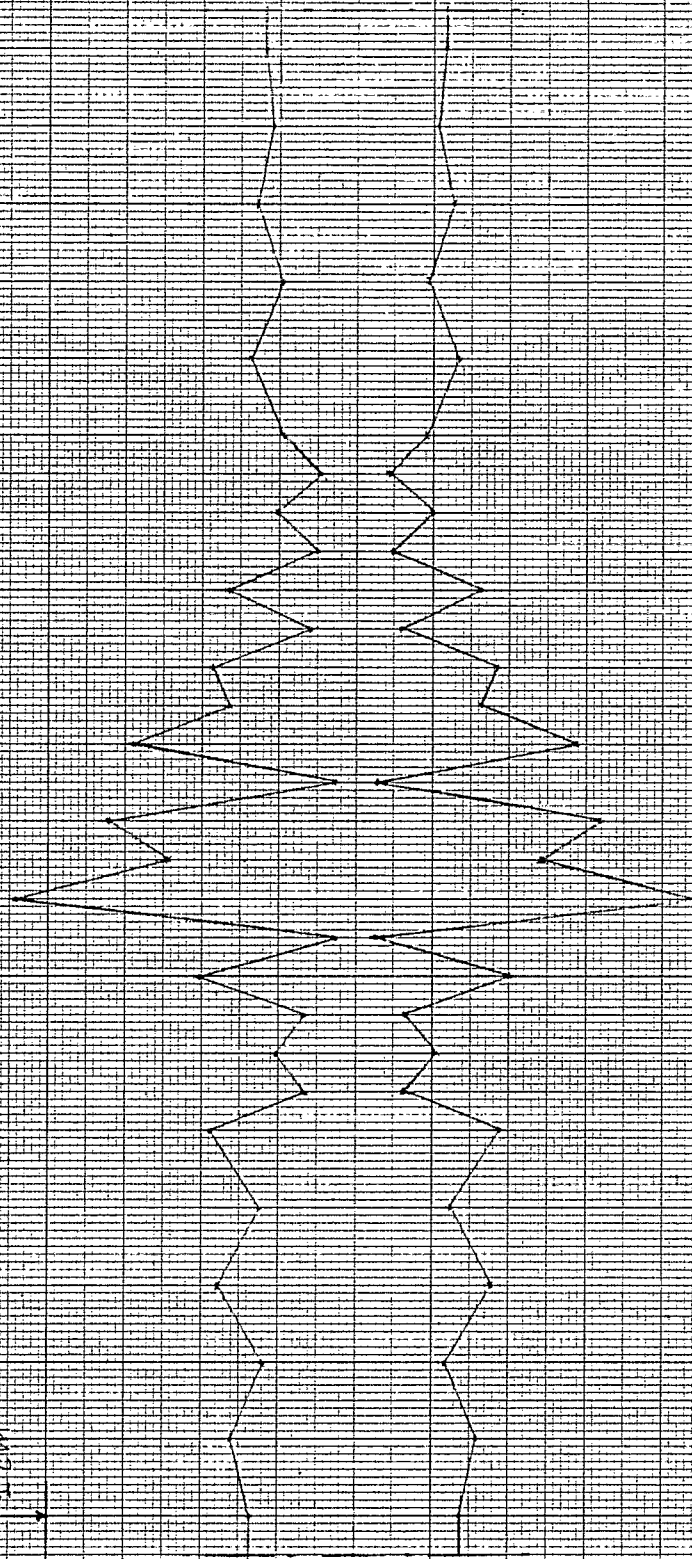
03/05/84 JL

Inner Arc

Q<sub>8</sub> Q<sub>7</sub> Q<sub>6</sub> Q<sub>5</sub> Q<sub>4</sub> Q<sub>3</sub> Q<sub>2</sub> Q<sub>1</sub> Q<sub>0</sub>

Outer Arc

2.0 cm



03/06/84 16.34.47 JOL

Beam height at origin

$$y = \frac{b}{\sqrt{E_d R}}$$

$$g_0 = \frac{m_e}{m_p} \times 10^{-3} \text{ rad } \mu\text{m}^{-1}$$

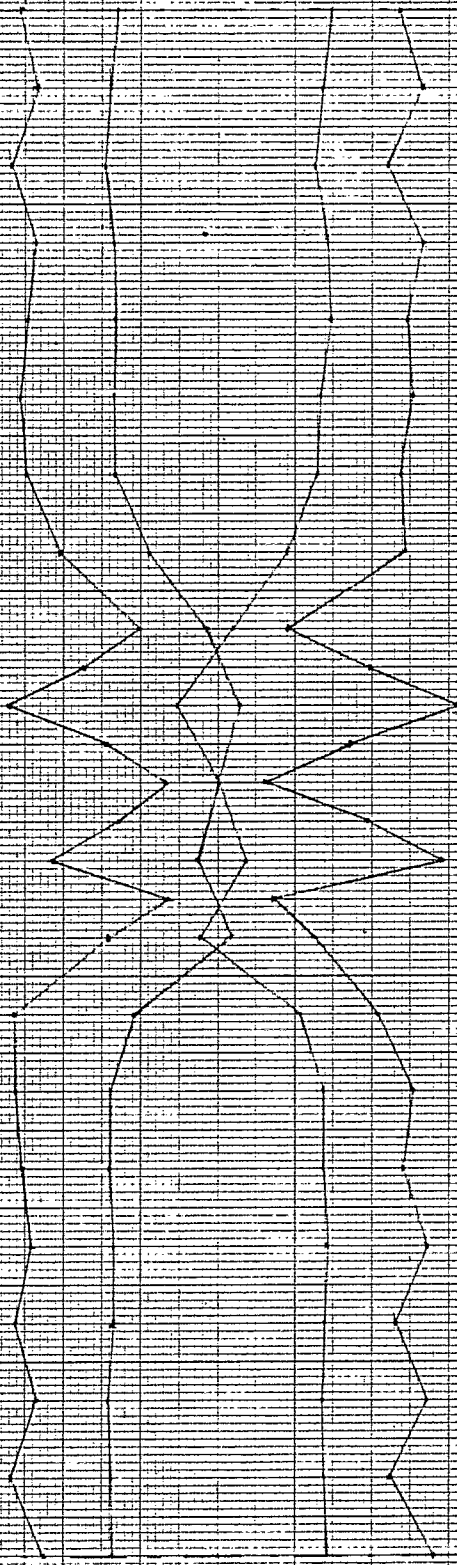
$$\frac{A}{k/p} = 1.0 \times 10^{-3}$$

Inner Arc

Outer Arc

$Q_1$   $Q_2$   $Q_3$   $Q_4$   $Q_5$   $Q_6$   $Q_7$   $Q_8$

1 cm



5.7  
5.60

5.7  
5.51

03/06/84 16.30.47 JCU

Beam width 10.5

$$X = \frac{1}{2} + X_{ep} = \frac{6}{\sqrt{15}} \approx 1.3$$

$$S_0 = \frac{1}{6} \cdot 10 \times 10^{-1} \cdot 10^{-4}$$

$$AP = 1.001$$



Inner Arc

Q8 Q6 Q4 Q2 Q1 Q3 Q5 Q7

Outer Arc

1 cm

$\pm 0.003$   
 $\chi_{co}$   
 $\pm 0.003$

427.7 m  
146.74

Beam dimensions after 2 hrs  
at  $\gamma = 12.5$

$E_0 = \frac{1}{6} \cdot 30 \times 10^{-6} \text{ cm}^2/\text{m}$

$\Delta p/p = \pm 0.003$

02/28/84 10:21:01

304