

## Extraction Efficiency

J. W. Glenn

October 1977

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.EY-76-C-02-0016 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.



Date 10/14/77 Time 1200-1400 Experimenters J.W. Glenn and H. WeisbergSubject Extraction EfficiencyOBSERVATIONS AND CONCLUSION

Objective: To repeat the SEC and extraction loss monitor calibration described in AGS Tech. Note #133 and measure the present extraction efficiency.

Procedure: Before the measurements, the electronics gains, high voltage settings and gas flows for the various loss monitors were checked and recorded, and at least one fault was repaired. A procedure is being devised for repeating this checkout in a routine way in the future.

Results: (1) Horizontal scanning of the beam across the C12 SEC showed no more than 1% efficiency variation across the beam spot. This unit uses single foils and mesh H.V. planes (the gold foil was being read out) and has received a cumulative dose of  $6 \times 10^{18}$  protons.

(2) Calibration of the SEC efficiency by the ring loss monitor method gives an efficiency of 910 counts/ $10^{12}$  protons, in disagreement with the result from foil calibration of 1000 counts/ $10^{12}$  protons.

(3) Loss monitor responses in counts per  $10^{12}$  protons were found to be as follows:

Parameter Varied	RLM	F10LM	F5LM
Sextupole current	550		
F10 radius	550	90	
F5 skew	550	40	65

The RLM calibration is similar to that obtained previously but the other two are 30% lower, for unknown reasons.

(4) Using these calibration factors we obtain the following losses and efficiencies for current operating conditions:

F5 loss	16%
F10 loss	0%
Ring loss	16%
Extraction efficiency (by loss monitor method)	84%
Extraction efficiency (by foil calibration)	76%

These measurements indicate that the extraction efficiency is ~6% worse than in the May-June SEB run, and that all the loss is at F5.

Recommendations: (1) The procedure to check the loss monitor electronics and gas flows should be carried out before each SEB run.

(2) After cooldown the F5 septum straightness should be measured.