



BNL-104063-2014-TECH

AGS.SN186;BNL-104063-2014-IR

## Observation of a Secondary Beam Using a Flag and TV Camera

E. Tombler

April 1985

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.

7/10/85

Number 186AGS Studies Report

Date(s) April 9, 1985 and later Time(s) \_\_\_\_\_  
Experimenter(s) E. Tombler, J. Weinmann, J.W. Glenn  
Reported by J.W. Glenn  
Subject Observation of a Secondary Beam Using a Flag and TV  
Camera

Introduction

Using a P22 phosphor coated flag in the A1 secondary beam, monitored by a "moon light" camera with a f1.8 lens, a beam spot was visible with fluxes of less than  $2 \times 10^5 \pi/\text{cm}^2/\text{sec}$  at the edge of the spot. Using "Radelin" flags and a f1.0 lens, observation of beams of about  $10^4$  parts/cm<sup>2</sup>/sec is expected.

Method

A flag coated with P22 phosphor, obtained by I.H. Chiang at Berkeley, was placed in the A1 beam to the MPS, upstream of their hydrogen target. Observing this flag was a RCA "silicon intensifier target" camera mounted with a f1.8 lens. The flag and camera were both in a light-tight box.

With a beam intensity of approximately  $4 \times 10^6 \pi$ 's per 1.2 second spill, the flag was centered on the beam and the picture video taped. Though taping degraded the picture a bit, the beam size was measurable and was 1.3" horizontal and 0.5" vertical ( $\pm 20\%$ ). This was about one-half the full beam widths as measured from typical beam hodoscope profiles at this location, as provided by A. Etkin.

Results

From the profiles about one-third of the  $4 \times 10^6 \pi/\text{sec}$  passed through the observed spot of 0.65 square inches. Thus, the average density in the spot was approximately  $2.5 \times 10^5 \pi/\text{cm}^2/\text{sec}$ . At the edges of the spot the density was down by about a factor of two, so the "critical" flux for this setup was  $\sim 10^5 \pi/\text{cm}^2/\text{sec}$ .

In May, this P22 flag was installed on the D223 flag drive and the sensitivity of this material was compared to the "standard" aluminum oxide flags. The P22 phosphor coated flag was found to be about twice as sensitive as the "standard" flag.

Comments

This sensitivity of  $1-2 \times 10^5 \text{ } \pi/\text{cm}^2/\text{sec}$  is consistent with the "standard" flag sensitivity of  $10^9 \text{ part}/\text{cm}^2/\text{sec}$  as the TV was 1000 times more sensitive than a standard TV and the flag a factor of two.

Use of a "Radelin" flag with about ten times the sensitivity and a f1.0 lens should give a factor of 30 over this setup, implying a TV camera and flag should be able to observe a spot with about  $10^4 \text{ part}/\text{cm}^2/\text{sec}$  densities. Use of "starlight" cameras would provide another factor of 10 but their high (approximately \$30K) cost and fragility prohibit wide-spread use.

mvh