BNL-105720-2014-TECH

EP&S No. 4;BNL-105720-2014-IR

2-3 GeV/c particle beams from the G-10 4.7¿ beam at the Brookhaven AGS

A. L. Read

May 1967

Collider Accelerator Department

Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

DISCLAIMER

Accelerator Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, L.I., N.Y.

EP & S DIVISION TECHNICAL NOTE

No. 4

A.L. Read* and R. Rubinstein

May 18, 1967

2-3 GeV/c PARTICLE BEAMS FROM THE G-10 4.7° BEAM AT THE BROOKHAVEN AGS

We have investigated the possibility of obtaining low-energy (2-3 GeV/c) particle beams from the G10 4.7° beam at the AGS. (The effect of the AGS fringe field in the orbits of the very low energy particles might be expected to limit the available phase-space aperture of the beam as the momentum is reduced, thereby reducing the intensity obtainable.) We have experimentally tuned the beam, using a scintillation counter telescope, at the following momenta:

3.0 GeV/c negative particles
2.4 GeV/c negative particles
2.0 GeV/c negative particles

3.0 GeV/c positive particles

The results are shown in Table I. For a detailed discussion of beam design and tuning procedures, see Reference 1). For a list of parameters of the tuned beam at 6 GeV/c and higher momenta, see Reference 2).

Note that the measured particle fluxes depended upon the size of the smallest counter in the scintillator telescope. At low momenta $\sim$ 2-3 GeV/c, the beam spot size was large $\sim$ 2-3"; this was due mostly to multiple scattering in several Cerenkov counters which were present in the beam. We estimate that most of the useful beam was counted by our telescope at 3 GeV/c and that perhaps $\sim$ 50% of the beam was counted at 2 GeV/c. The beams consist mostly of π^- or π^+ mesons. In order to make crude estimates of K^+, K^-, p and $\bar{p}$ fluxes, see Reference 3) which gives some data on the production of these particles relative to pions, at 4.75°. The data presented here were taken with an intermediate slit (collimator) size of ½" x ½"; $\Delta p/p \simeq 2\%$ FWHM.

---

*Laboratory of Nuclear Studies, Cornell University, Ithaca, New York

TABLE I

Magnetic fields are given in shunt millivolts. Radial Target Position (from control room monitor) = +1.6".

Momentum (GeV/c)	3 (-ve)	2.4 (-ve) (very crude tuning)	2 (-ve) (crude tuning)	3 (+ve) (crude tuning)
Magnetic fields (mV)				
Q_1 (25 A/mV)	17.4	14.4	16.0	10.5
Q_2 (25 A/mV)	18.4	12.3	11.0	18.4
Q_3 (25 A/mV)	14.1	9.6	9.6	14.0
Q_4 (25 A/mV)	13.8	9.2	9.2	13.8
$Q_{5,6}$ (25 A/mV)	6.7	4.5	4.5	6.7
D_1 (40 A/mV)	6.6	4.24	4.25	7.25
D_2 (40 A/mV)	6.76	5.52	4.48	6.77
Q_7 (25 A/mV)	9.7	6.6	6.5	9.6
Q_8 (40 A/mV)	11.2	7.5	8.2	10.7
Q_9 (25A/mV)	12.1	8.1	8.1	12.1
Approximate no. of Particles/10^{12} AGS protons (28GeV) spilled onto G-10 target	1.4×10^6	4×10^5	1.2×10^5	6×10^5

References

1). A.L. Read and R. Rubinstein BNL Internal Report #BNL 9213

2). A.L. Read AGS EP & S Technical Note #2

3). W.F. Baker *et al*. P.R.L. *7*, 101 (1961).