Cumulative Protons after K+ -mesons Interactions inside (CH) Target

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The purpose of this report to show proton spectrum after K^+-meson interactions inside carbon nuclei. A momentum of K+-meson was 80-200 MeV/c.

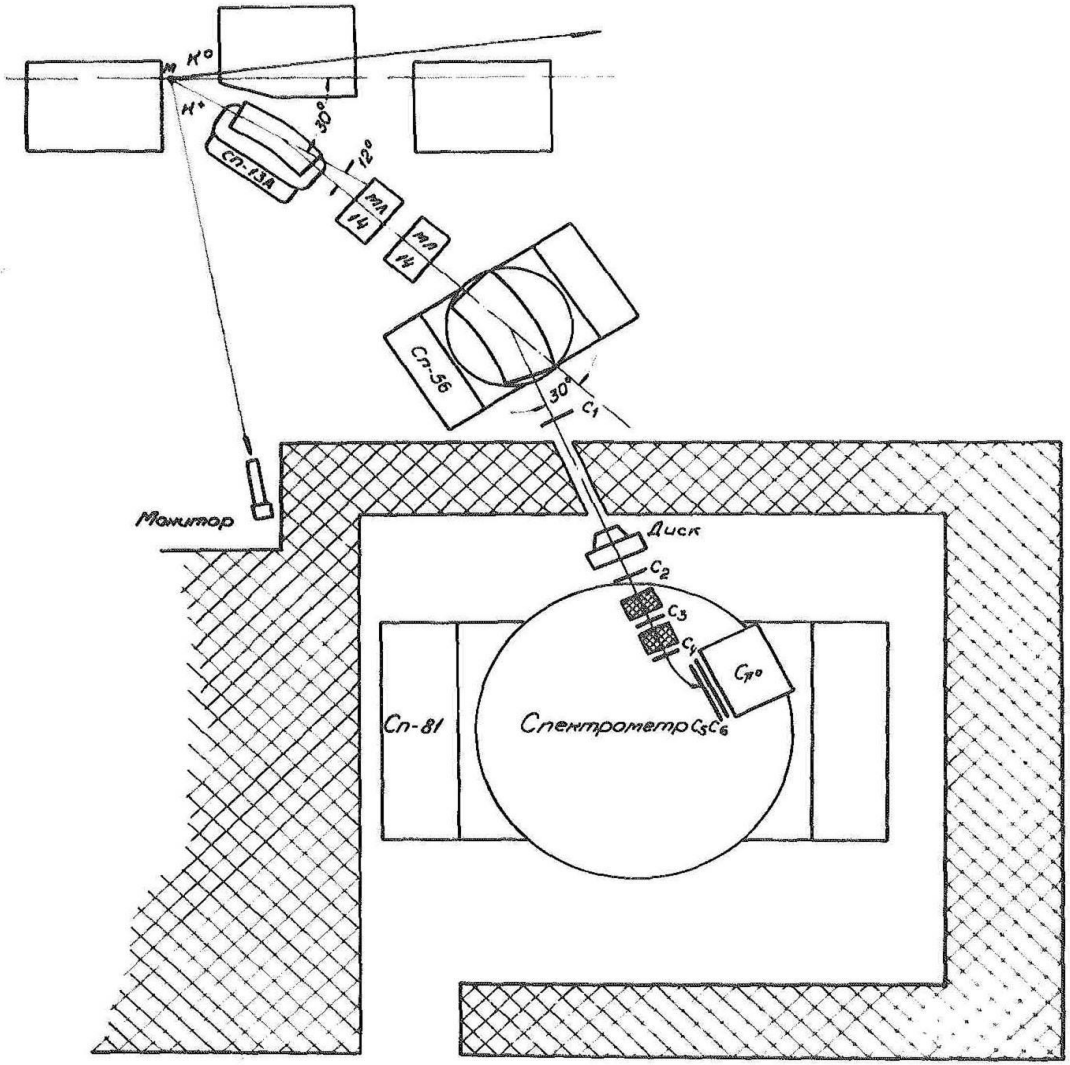
We used a magnetic spectrometer with streamer chamber [1].

It was analyzed near 32000 events, and it was K^+-meson decay production, mainly [2].

But approximately 500 of them was protons, and 384 had momentum larger than Fermi momentum in carbon nuclei. And we present the spectrum of that events.

In spectrometer we registered the particles in backward (140-170 degree to beam), and it was be cumulative protons.

1. A.O. Weissenberg et al., Preprint ITEP-12, 1974.
2. A.O. Weissenberg et al., Nuclear Physics B115 (1976) p.55


Н°
Н⁺
30°
12°
Сп-13А
МЛ 14
МЛ 14
Сп-56
30°
С1
Монитор
Диск
С2
С3
С4
С4°
Сп-81
Спектрометр С5С6

MEASUREMENT OF THE BRANCHING RATIOS FOR **K μ2, Kπ2, Ke3** AND **Kμ3** DECAYS USING A MAGNETIC SPECTROMETER WITH STREAMER CHAMBERS

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The momenta of ~30 000 charged particles from K decays were measured using a magnetic spectrometer with streamer chambers. The ratio $R = \Gamma(K\pi 2)/\Gamma(K\mu 2) = 0.3355 \pm 0.0057$ was obtained.

Our values for the branching ratios are:

(63.18 ±0.43)% for K+μ2,

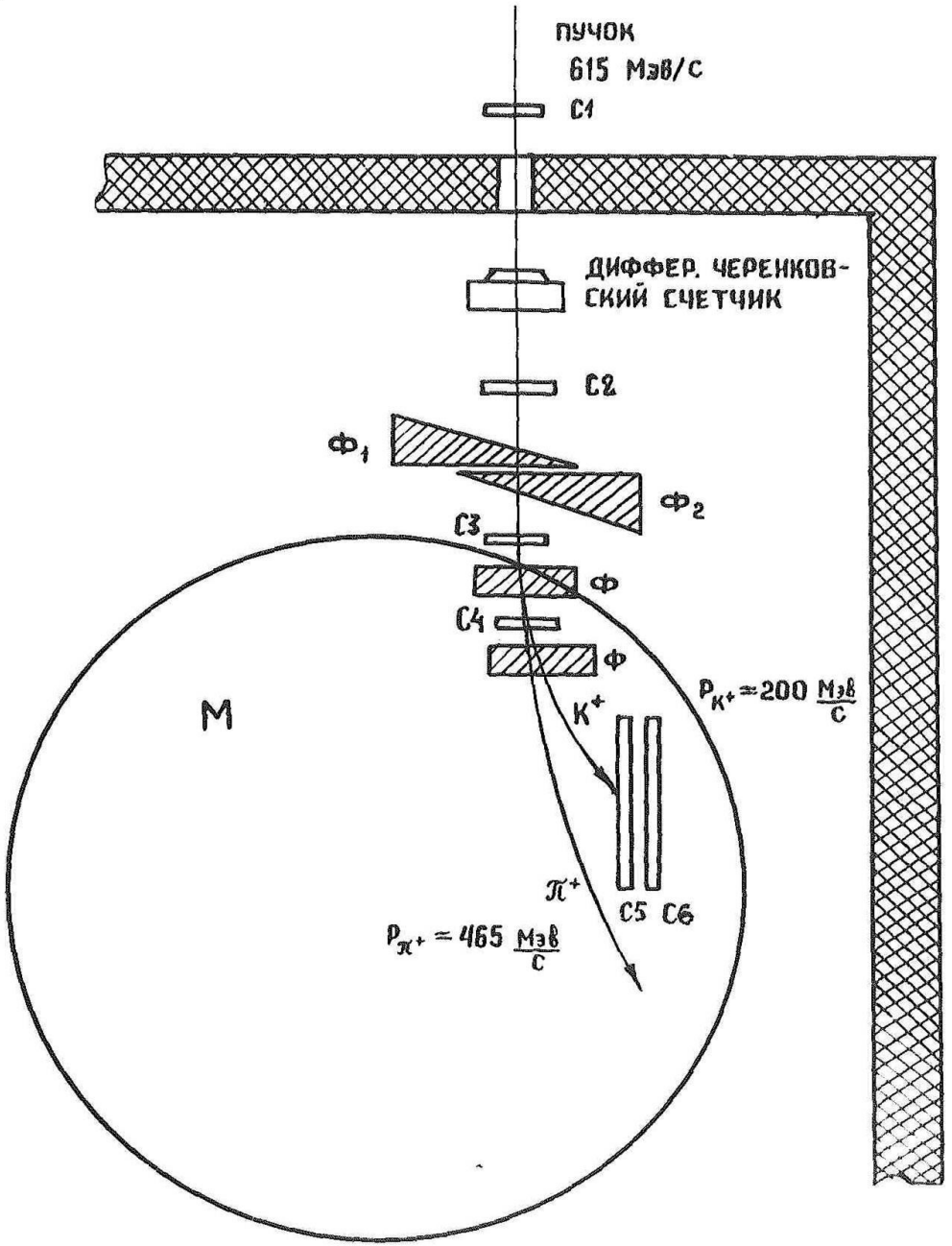
(21.18 ± 0.33)% for K+π2 ,

(3.33 ± 0.51)% for K+μ3,

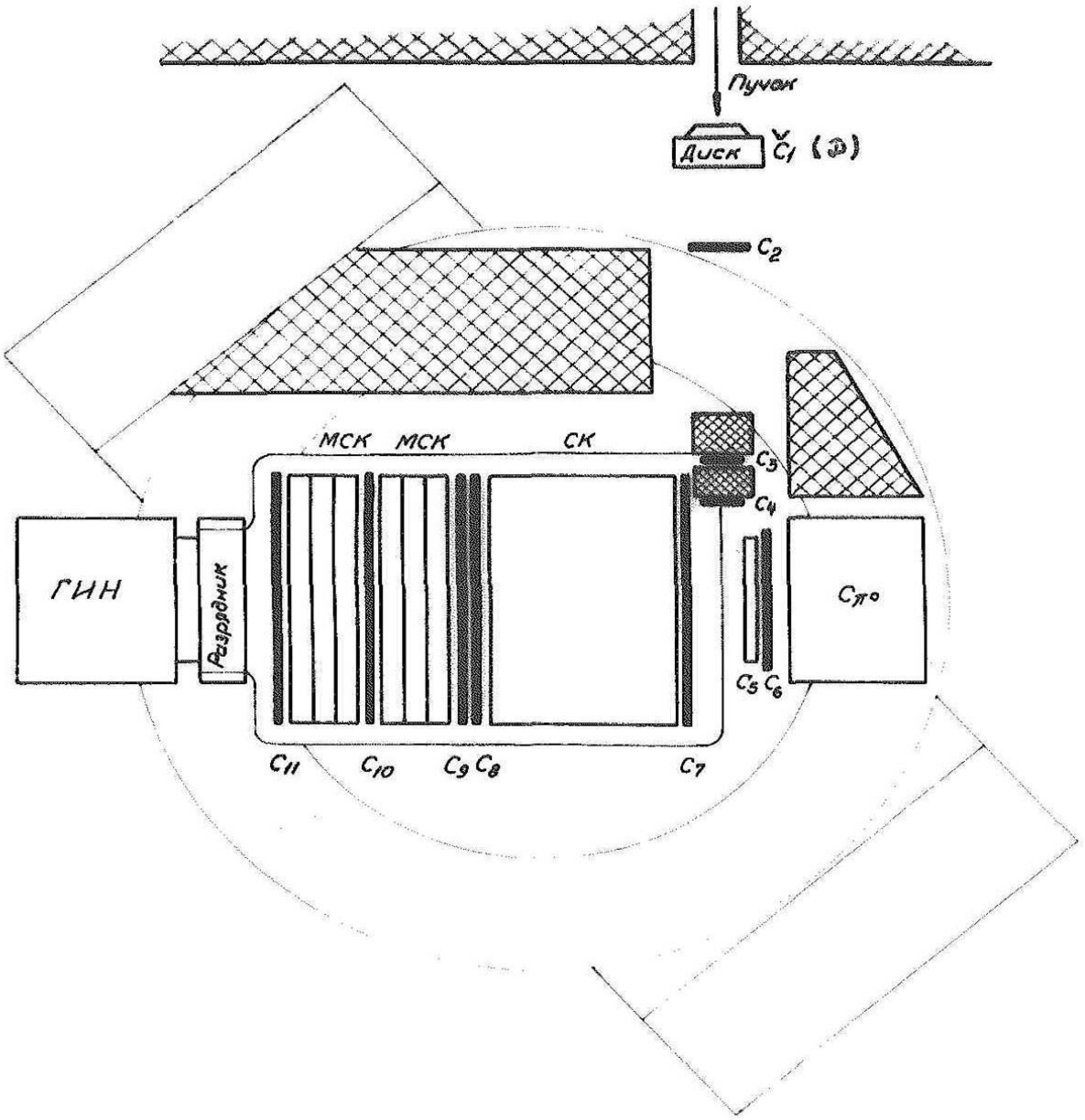
(4.99 ± 0,54)% for K+e3 .

The magnetic canal for the kaon beam with momentum **p = 615 ± 15 MeV/c** and 1000 K+/pulse had **π/K ratio 300 : 1.**

K+ mesons were identified by Čerenkov differential counter C1 with a solid radiator and **π supression 1000**. More over we used amplitude discrimination in C3, C4, C5 and C6 counters. **The resulting supression in our system was better than 10000.**

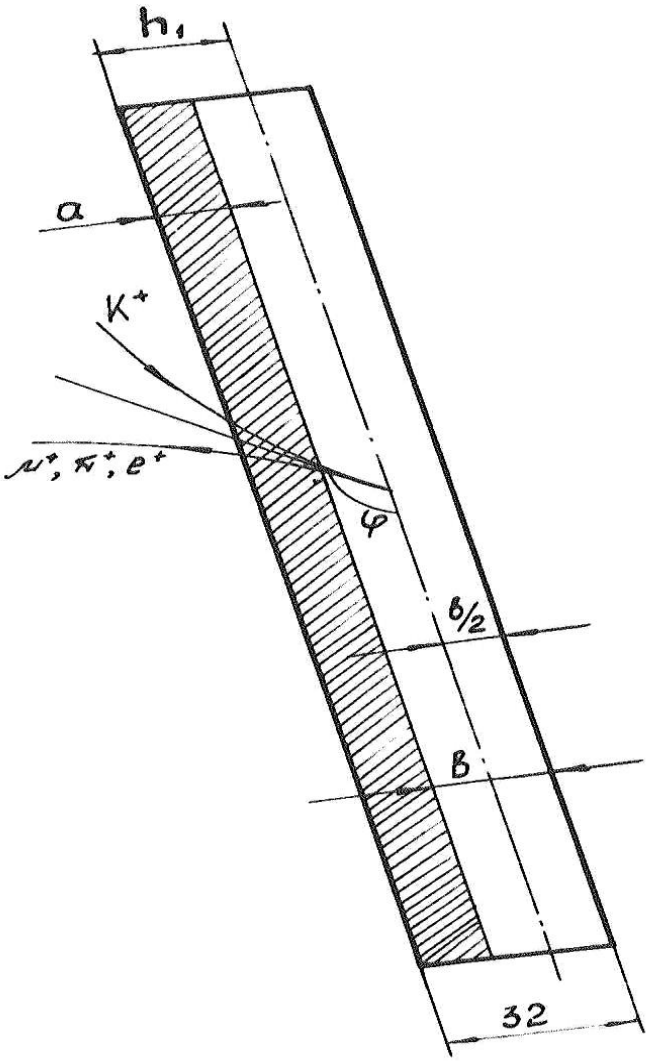

ПУЧОК
615 Мэв/с
С1
ДИФФЕР. ЧЕРЕНКОВ-
СКИЙ СЧЕТЧИК
С2
Ф1
Ф2
С3
Ф
С4
Ф
М
K+
Pк+=200 Мэв/с
π+
С5 С6
Pπ+ = 465 Мэв/с

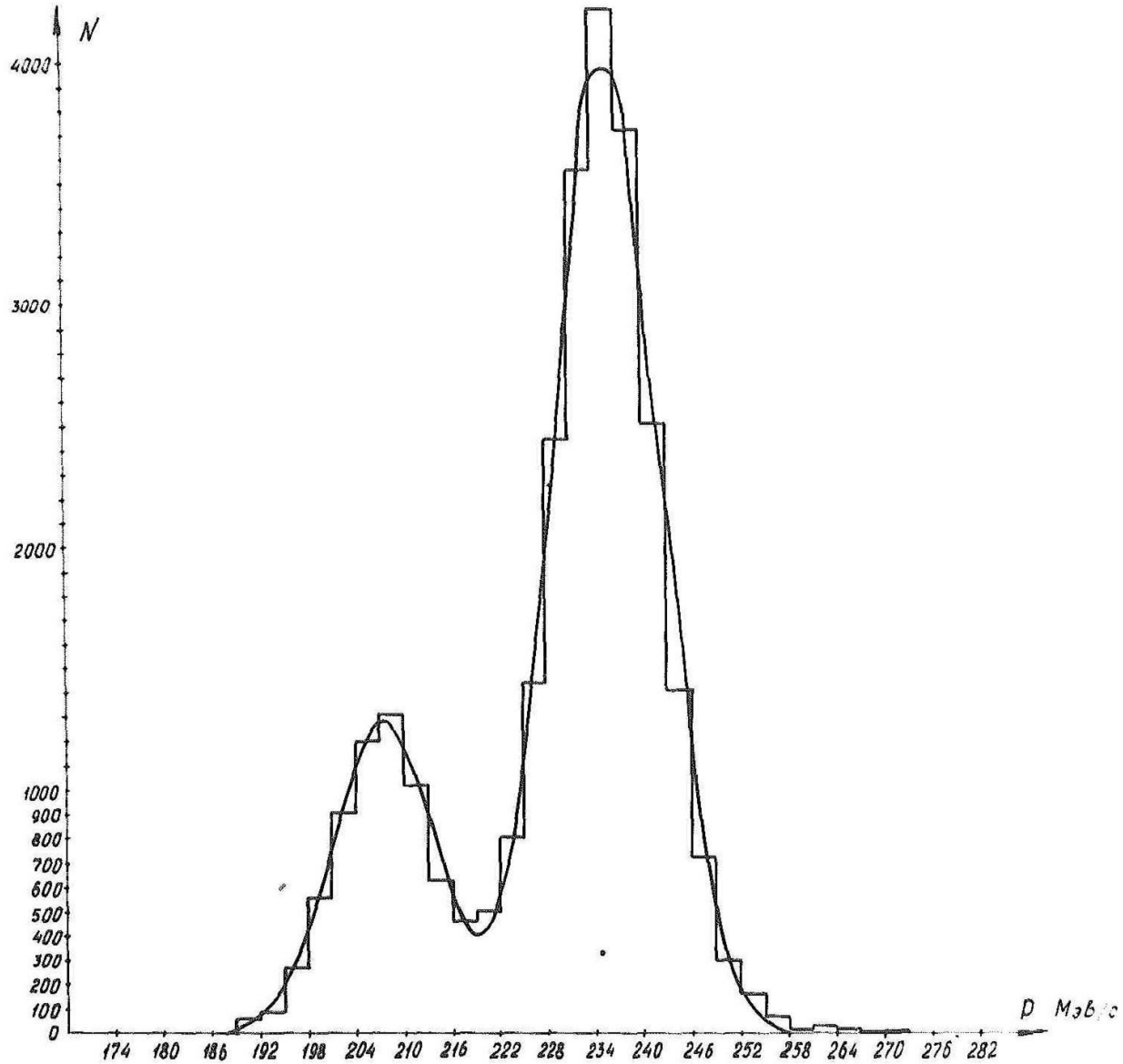
- To diminish a background from interaction of pions in counter C5 the delay of the stopped kaon signal C1C2C3C4C5 and anti C6 (the "gate") was 6 nsec. This 25 nsec wide "gate" was plashed in coincidence with the signal C7C8C9 obtained from detecting K+ decay products and cumulative protons. The signal C1C2C3C4C5 and anti C6 + C7C8C9 triggered the streamer chamber.
- The magnetic field of the spectrometer was vertical and occupied a 140 cm diameter circular region about 50 cm high. The streamer chamber (SC) and the multiplate streamer chamber (MSC) were placed in the magnetic field which varied by a total of about 5% over the useful volume. The former chamber was to measure the momentum of the charged secondaries, the latter, to identify the secondaries.


Пучок
Диск
C_1 (Ф)
C_2
МСК
МСК
СК
C_3
C_4
ГИН
Разрядник
$C_{по}$
C_5 C_6
C_{11}
C_{10}
C_9 C_8
C_7

- We represents the momentum spectrum of 31 419 charged secondary particles from K+ decay in target C5. In this spectrum two lines corresponding to the decays K+π2 and K+μ2 are clearly seen. The events in the momentum range 130—190 MeV/c correspond mainly to the total spectrum of the positrons and muons from Kμ3 and Ke3 decays. The background was defined from events with momentum p > 280 MeV/c and amounted to 1.14 events per 1 MeV/c. The analysis of the background events and corrections to the ionization loss of particles until they reach SC have been described in detail in [1]. The solid curve shows the normalized descriptions of the experimental histogram with two normal distributions corresponding to the Kπ2 and Kμ2 decay modes.

- 1. A.O. Weissenberg et al. Preprint ITEP-28, 1975


h1
a
K+
μ+, π+, e+
φ
b/2
B
32


N
4000
3000
2000
1000
900
800
700
600
500
400
300
200
100
0
174
180
186
192
198
204
210
216
222
228
234
240
246
252
258
264
270
276
282
p Мэв/с

A proton spectrum contain 384 particles from 280 up to 650 MeV/c.

In streamer chamber it is very easy to define protons, because their **dE/dx** two-three times bigger than K-mesons decay products.

An yield cumulative protons in reaction: $a+A \rightarrow b+X$ ordinary describes using a function: $f = E\, d^3\sigma/dp^3$ with

Approximation [1]: $f = C \exp(-Bp^2)$,

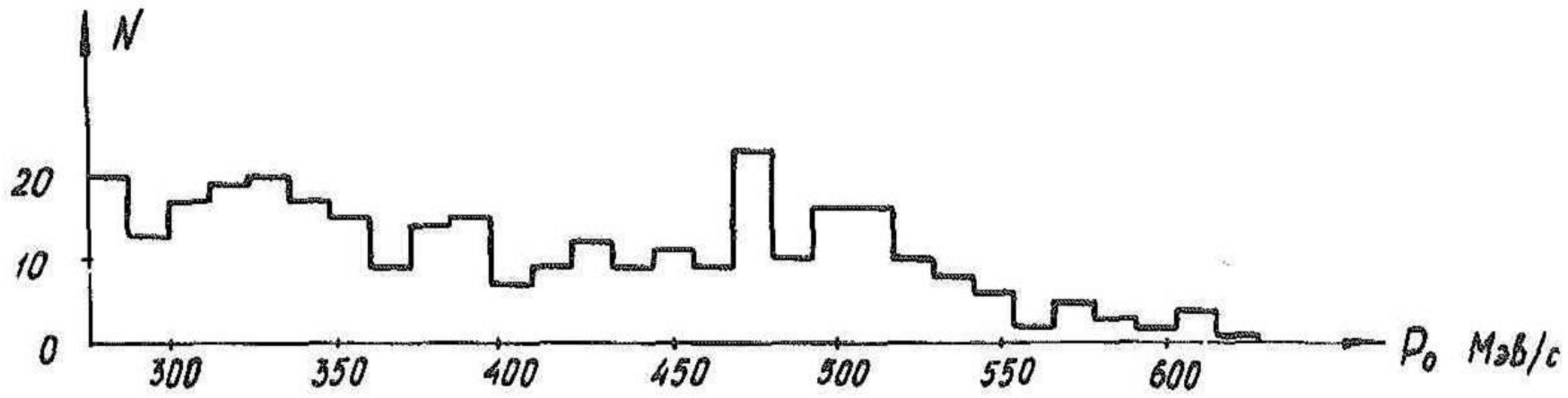
were E and p is energy and momentum b.

If scaling realize, B not must depend on a and A.

But typical meaning is $B = 10.9 \quad 1.8\ (GeV/c)^2$ [2].

In that experiment: $B = 5.2 \quad 1.0\ (GeV/c)^2$, and effective temperature (E_T) in our experiment two times bigger, when [2] !?

1. V. Gavrilov G. Leksin, Preprint ITEP-128, 1989
2. M. Dayon et al. Z. Phys. C, v. 56, p. 391, 1992


N
20
10
0
300
350
400
450
500
550
600
P_0 Мэв/с

Thank you very much