national accelerator laboratory

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SECONDARY PARTICLE PRODUCTION AT 200 GeV

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June 9, 1969

At the 1968 NAL Summer Study,[1] T. G. Walker compared various formulae which give secondary particle yields from p-p collisions. He concluded that the Hagedorn-Ranft yields[2] were generally the most reasonable ones to use in the experimental design studies.

Recently, we have obtained a copy of a program from J. Ranft which used a more developed version of the thermodynamical model. This version contains significant improvements over the older one. These include improved treatment of isobar contributions to pion yields, more careful attention to yields near the kinematic limit, new fits to experimental results at 19, 30, and 70 GeV[3,4,5] as well as yields from four other nuclei.

Accordingly, we present in Figures 1-18 yield curves for $\pi^{\pm}$, $K^{\pm}$, p, $\bar{p}$ by 200 GeV protons on H, Be, and Pb. Pb is given as representative of a W-target. Figures 19-21 are yield curves for π^-, K^-, $\bar{p}$ by 70 GeV protons on Al. These can be compared directly to the recent Serpukov results.

These curves have been calculated using the program SPUKJ written by J. Ranft and kindly supplied to us by him.

The calcomp plots were made by a subroutine written by Miss A. Georgoulakis.

The latest version of SPUKJ has constants to predict yields from Al and Cu, too.

The older version of the thermodynamical model gives Λ, Σ, and Ξ production by protons on a hydrogen target.

On short notice, curves may be produced for protons of other incident momenta, Al and Cu targets, and hyperons from protons incident on hydrogen.

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References

1. T. G. Walker, NAL Summer Study, B.5-68-24 (1968).

2. R. Hagedorn and J. Ranft CERN/ECFA 67/16 1 70 (1967). This preliminary work was superceded by a later published version of the thermodynamical model: R. Hagerdon and J. Ranft, Suplemento Al Nuovo Cimento, Ser. I, 6, No. 2, p. 169 (1968).

3. D. Dekkers, et al., Phys. Rev. 137, B962 (1965).

4. E. W. Anderson, et al., Phys. Rev. Lett. 19 No. 4, P. 198 (1967).

5. Yu B. Bushnin, et al., Physics Letters, 29B No. 1 (1969).

Figure Identification Number

Proton incident momentum = 200 GeV/c

Secondary Particle:	Target Material: H	Be	Pb
p	1	7	13
π^+	2	8	14
π^-	3	9	15
K^+	4	10	16
K^-	5	11	17
$\bar{p}$	6	12	18

Proton incident momentum = 70 GeV

Target Material: Aluminum

Secondary Particle:	π^-	K^-	$\bar{p}$
Figure Number:	19	20	21

2.13800 3.56600 5.46200 0.00570 18.87699 2.82300 0.93670 0.00230 0.00000 0.00000

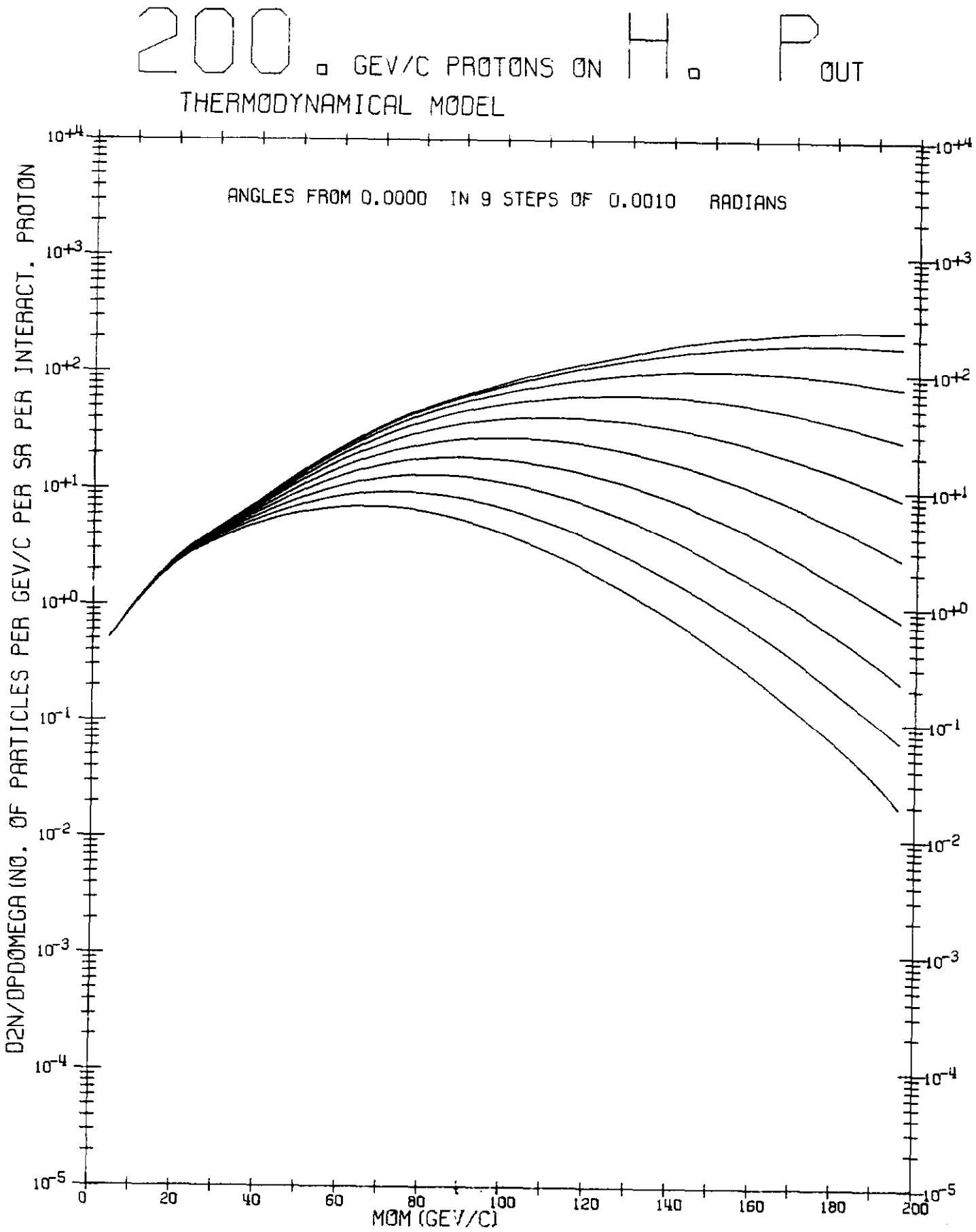

Fig. 1

2.13800 3.56600 5.46200 0.00000 18.87699 2.82300 0.93670 0.00230 0.00000 0.00000

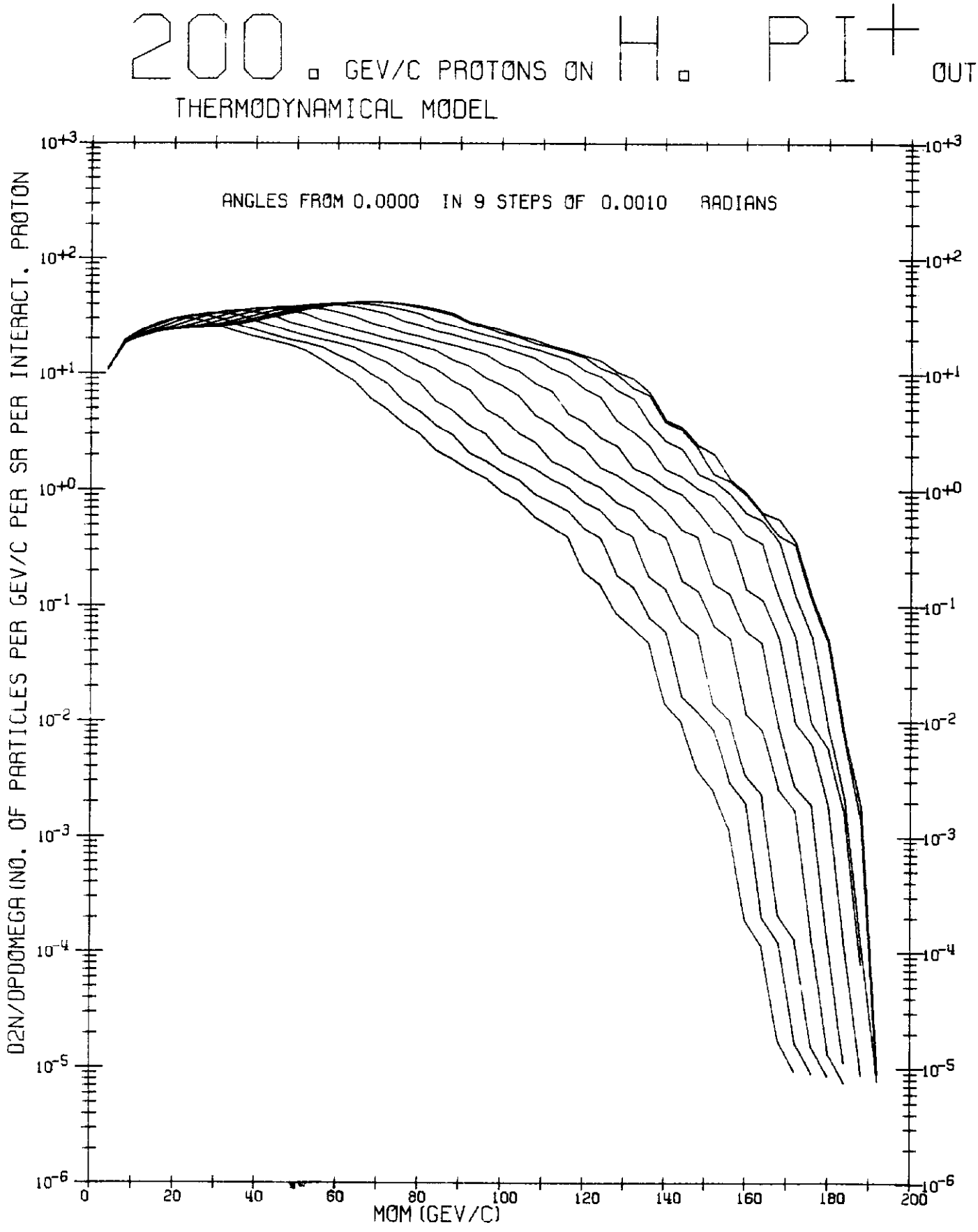

Fig. 2

2.40000 0.50000 0.00000 0.00000 5.13050 0.83780 0.54230 0.00000 0.00000 0.00000

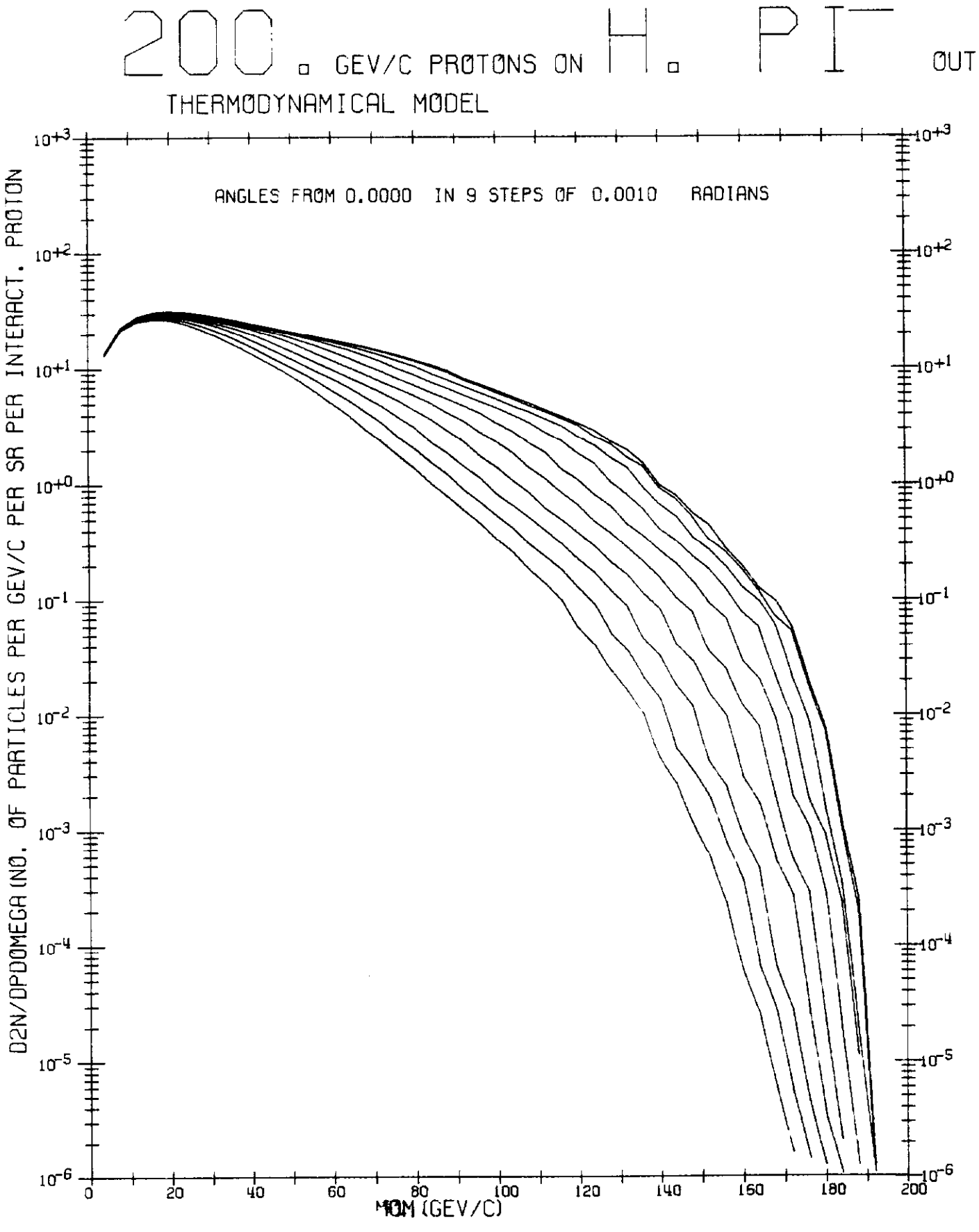

Fig. 3

2.78700 5.29300 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000

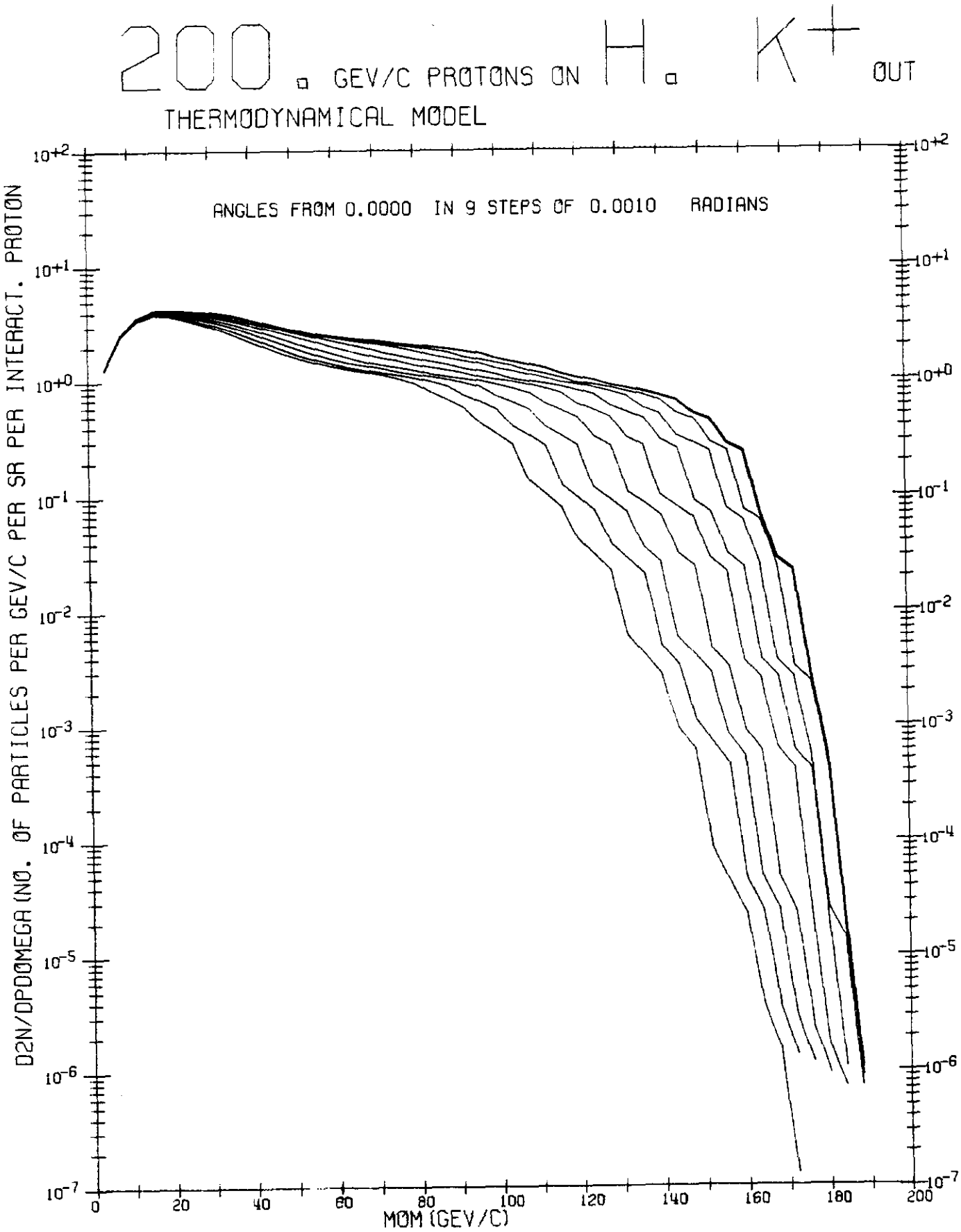

Fig. 4

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0.00000 0.00000 5.52300 0.50000 5.13050 0.00000 0.54230 0.00000 0.00000 0.00000

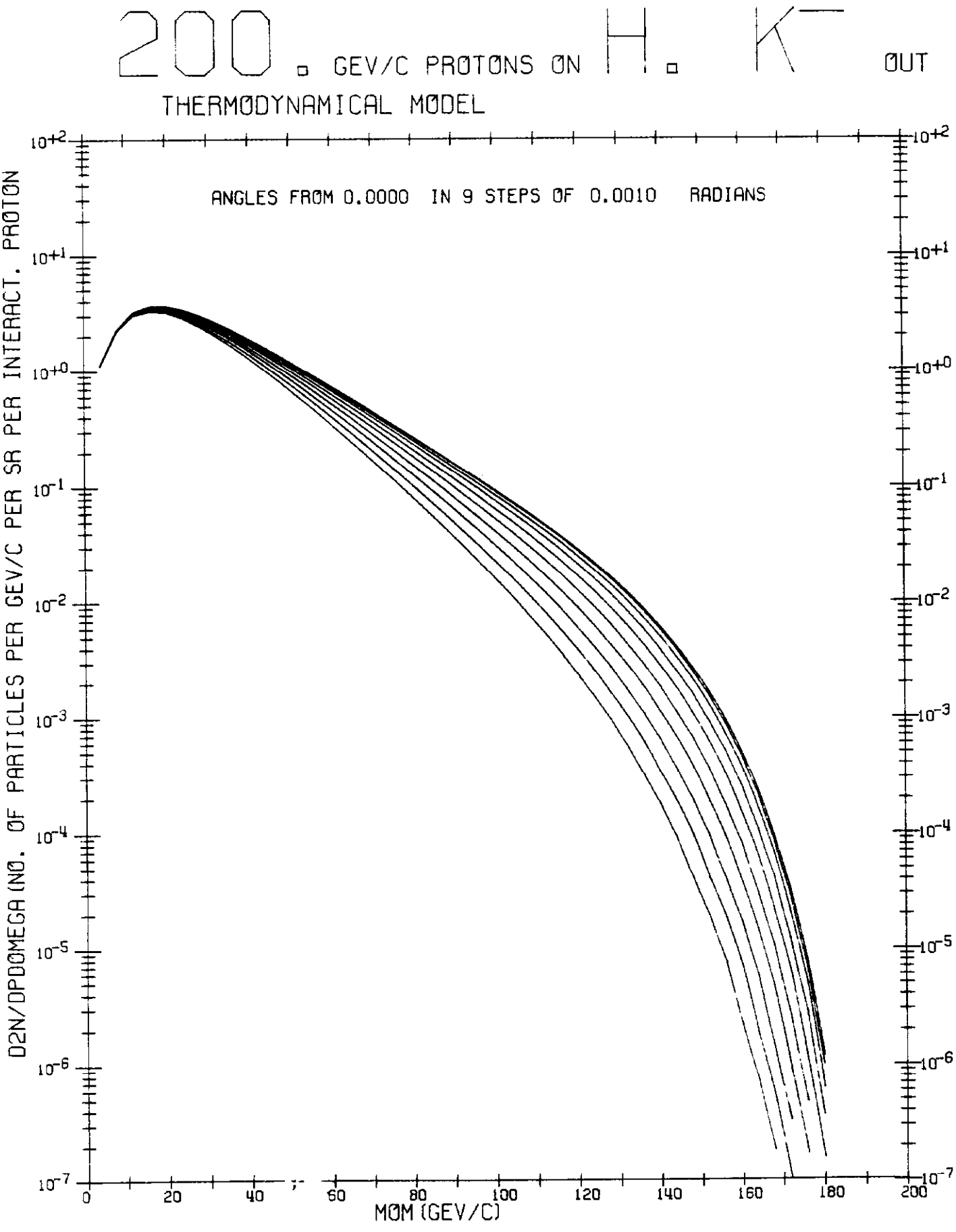

Fig. 5

0.00000 0.00000 6.35200 0.50000 5.13050 0.00000 0.54230 0.00000 0.00000 0.00000

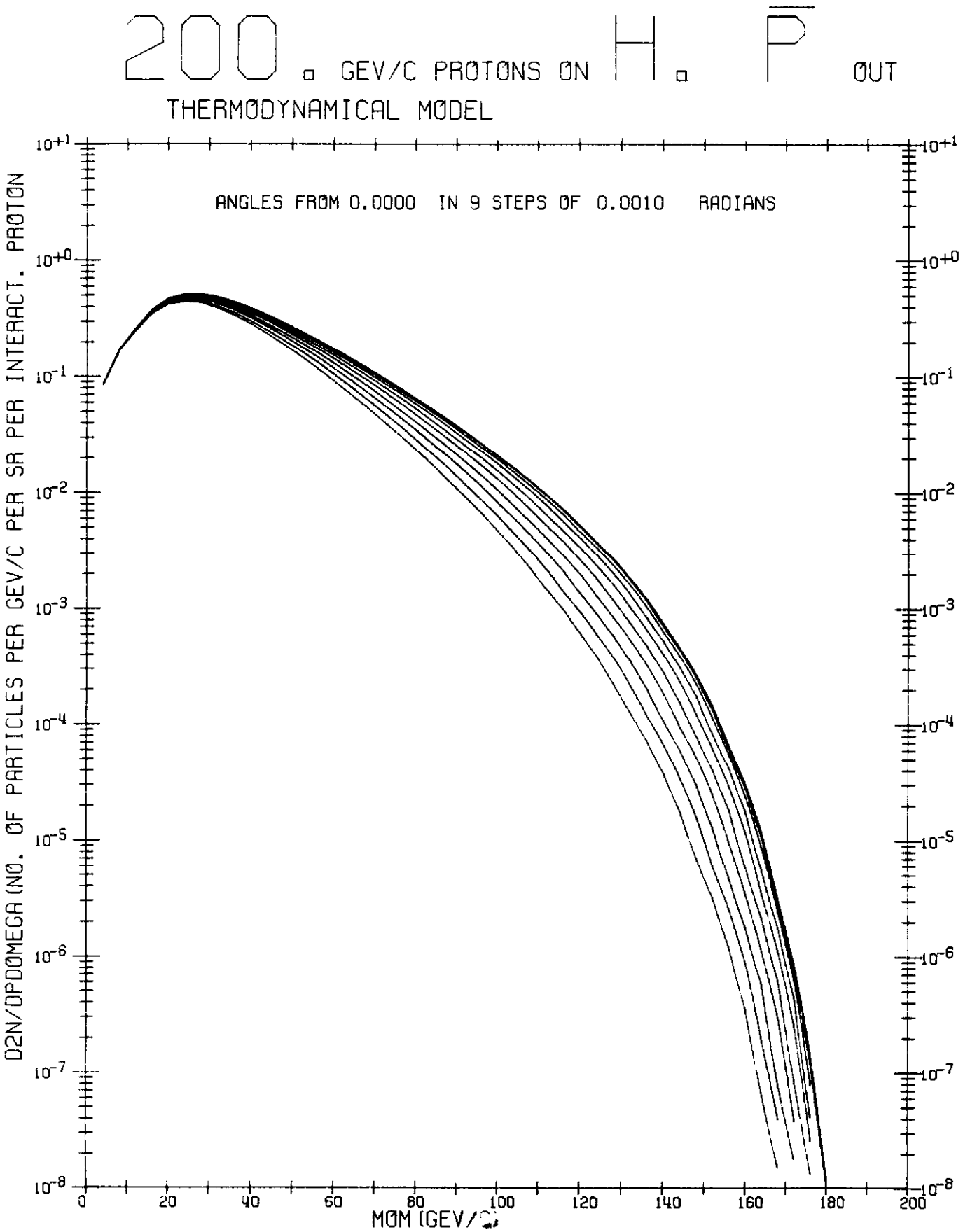

Fig. 6

1.84100 3.17600 5.25500 0.16700 16.09996 3.51300 0.62400 0.00000 0.00000 0.00000

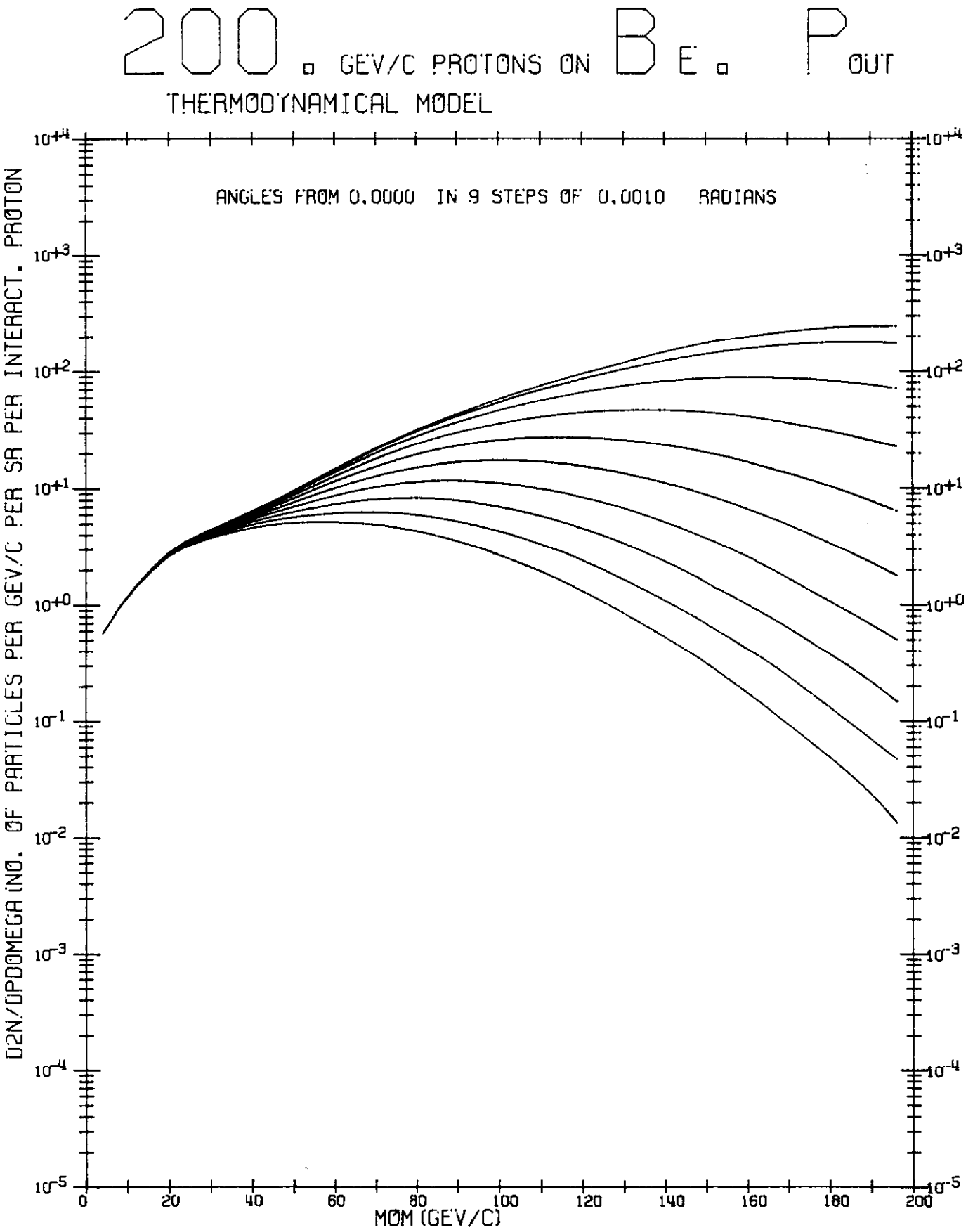

Fig. 7

1.84100 3.17600 5.25500 0.00000 16.09998 3.51300 0.82040 0.00000 0.00000 0.00000

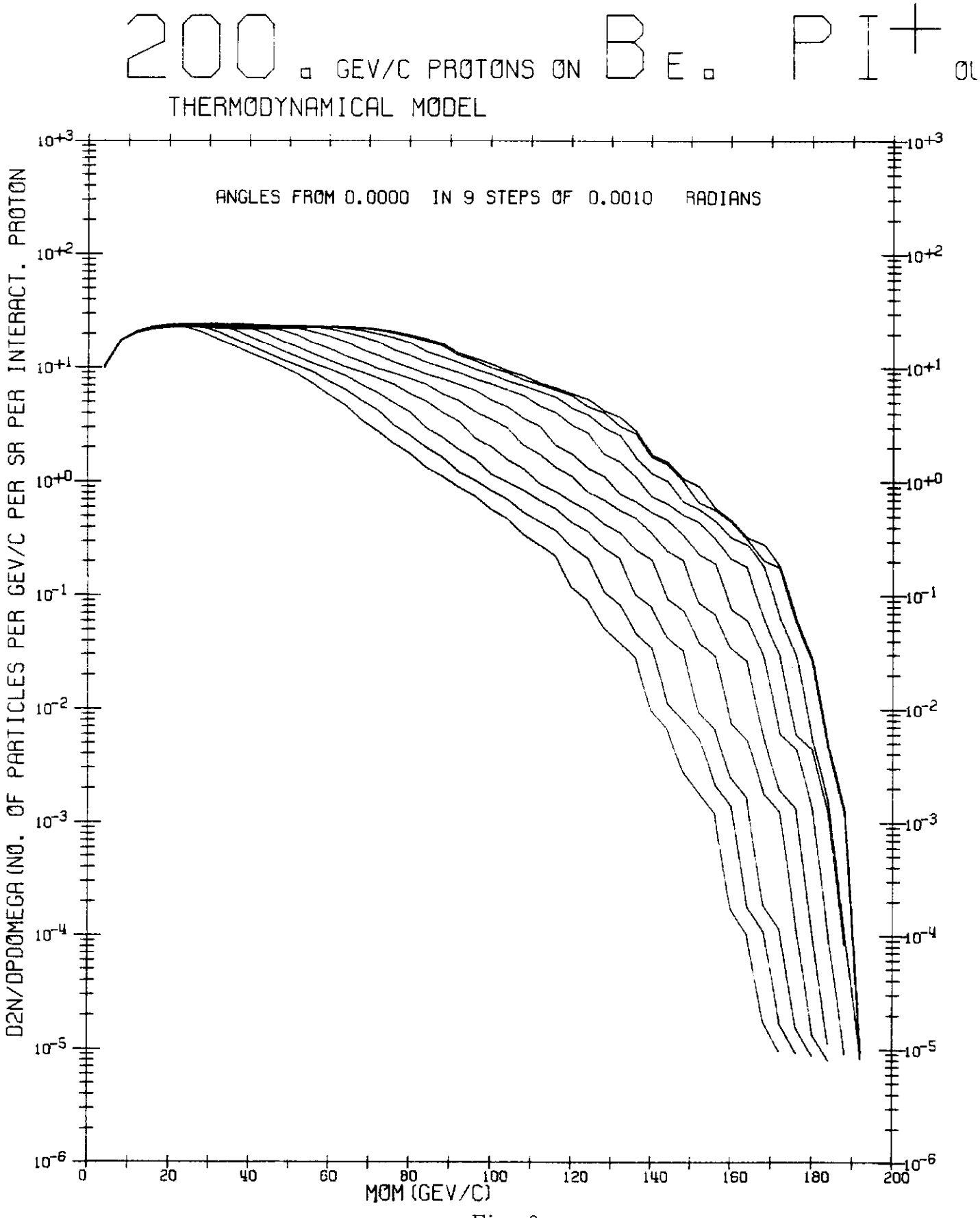

Fig. 8

2.27360 0.50000 0.00000 0.00000 4.88879 0.57150 0.48480 0.00000 0.00000 0.00000

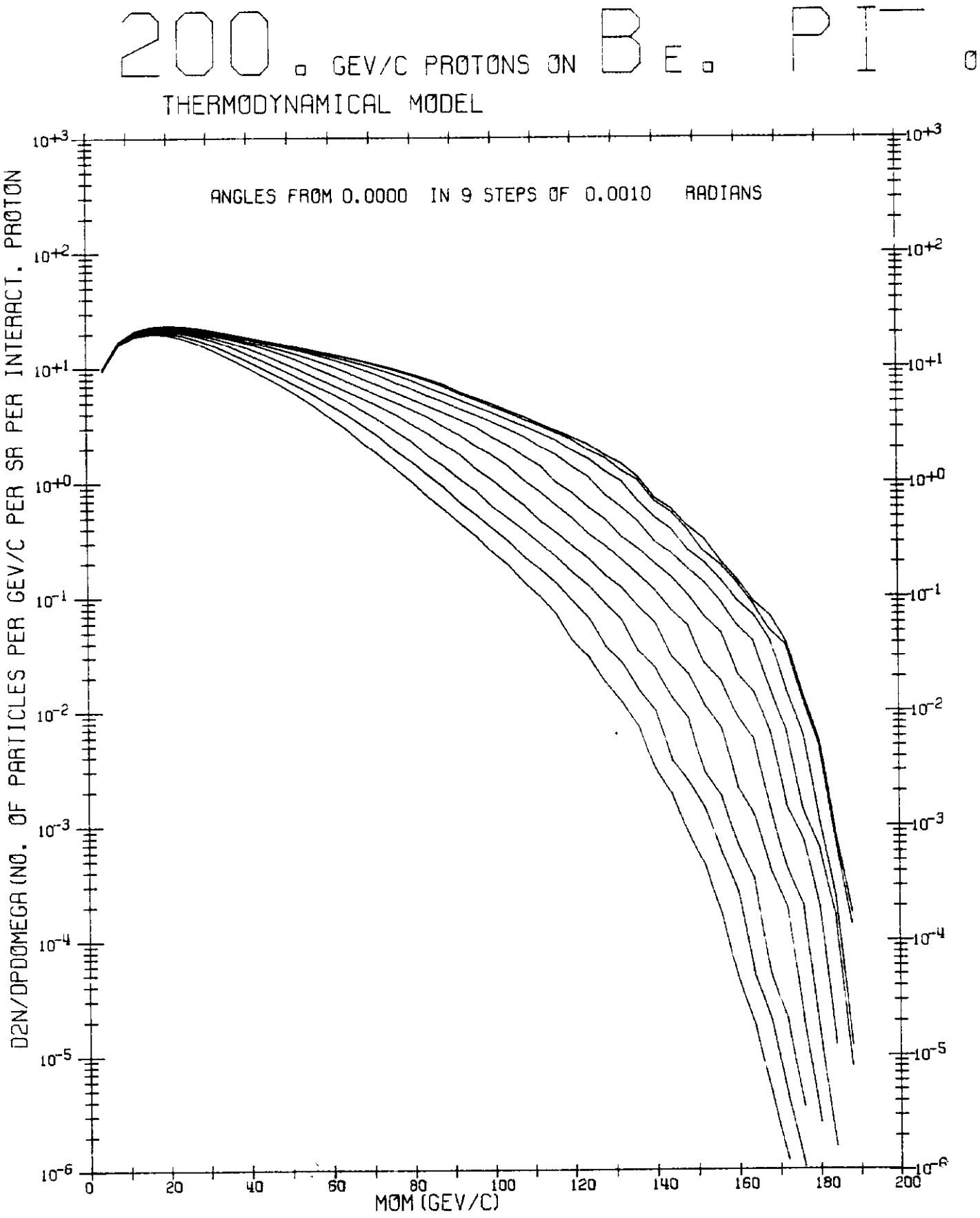

Fig. 9

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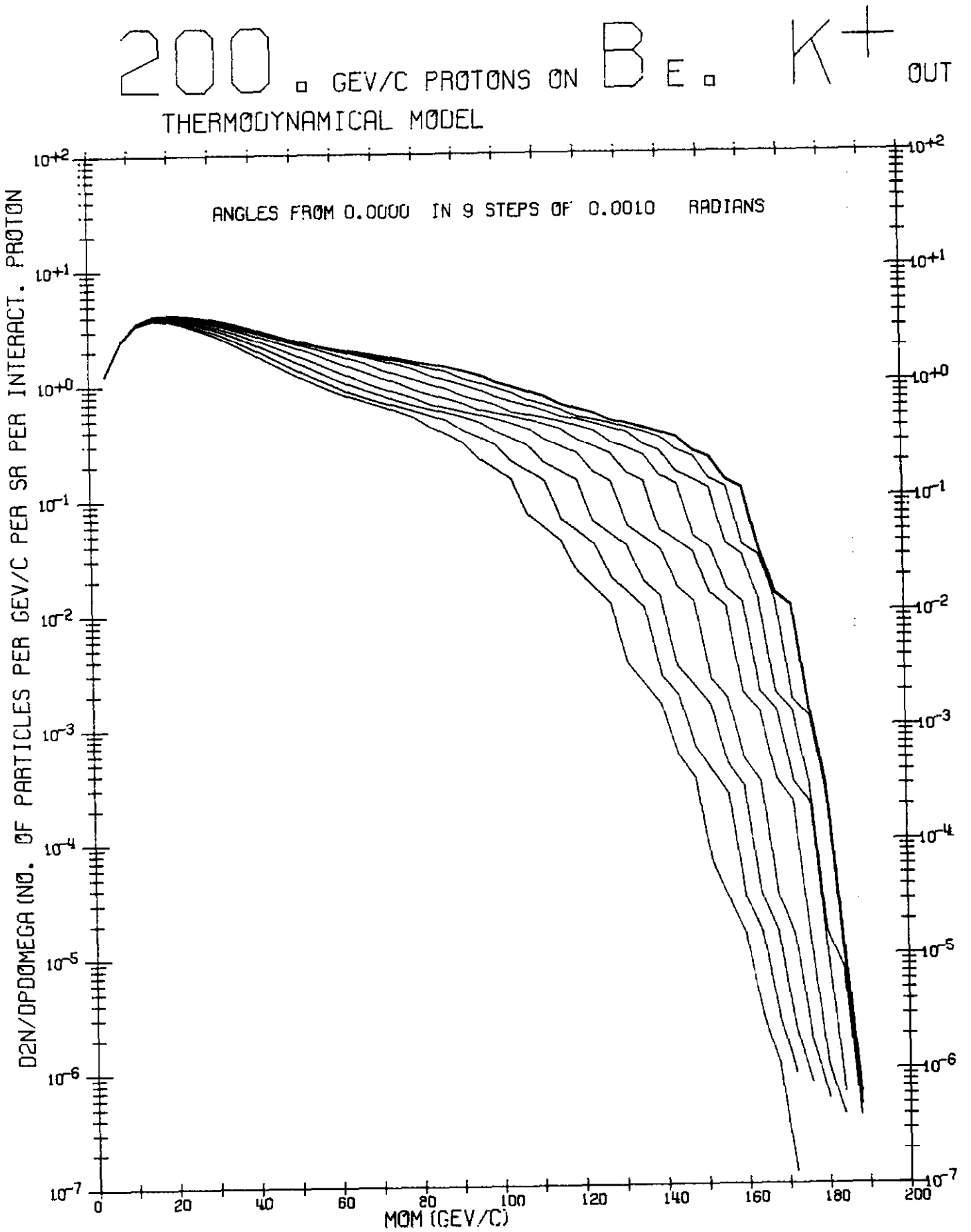

Fig. 10

0.00000 0.00000 5.41730 0.50000 4.88679 0.00000 0.48480 0.00000 0.00000 0.00000

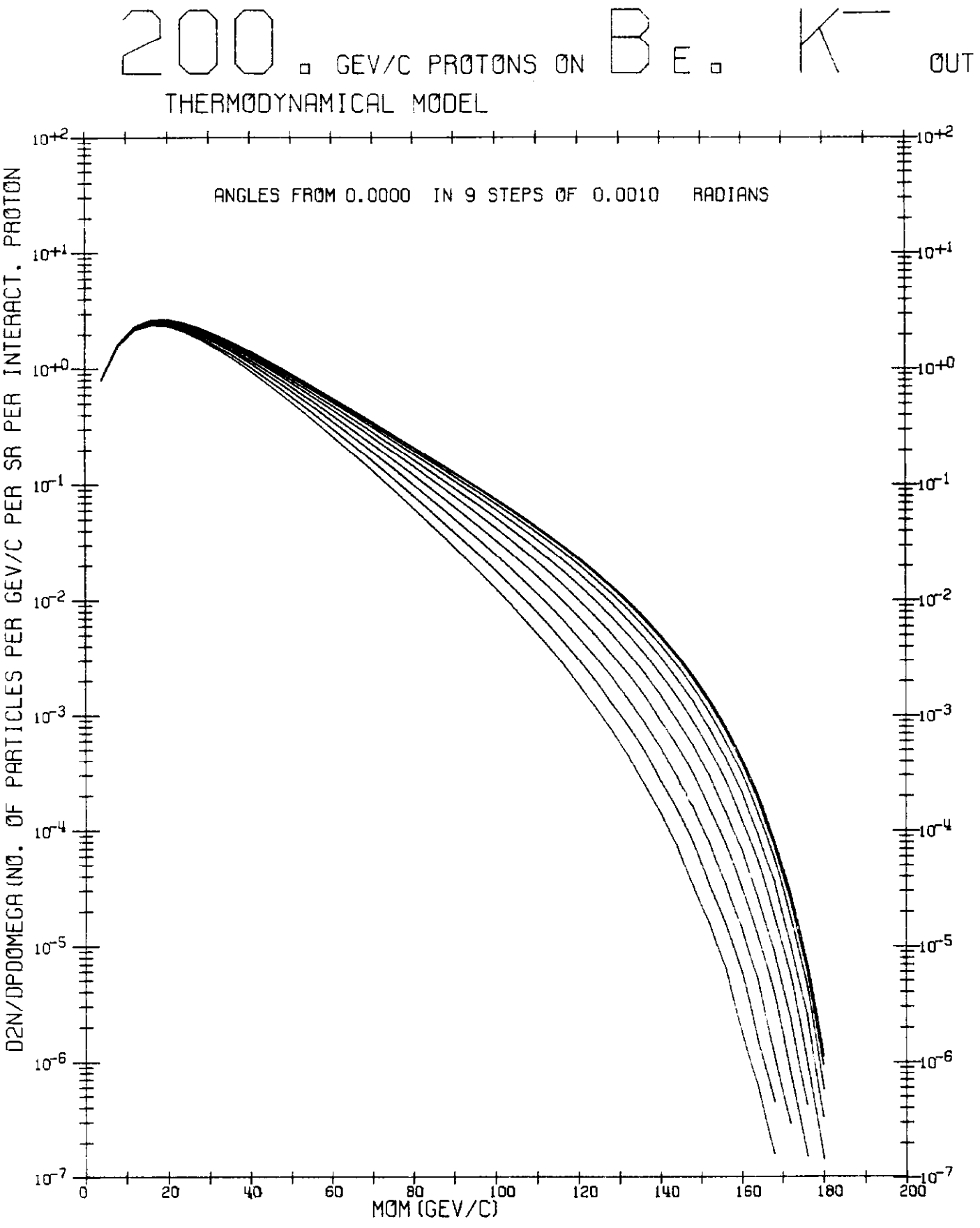

Fig. 11

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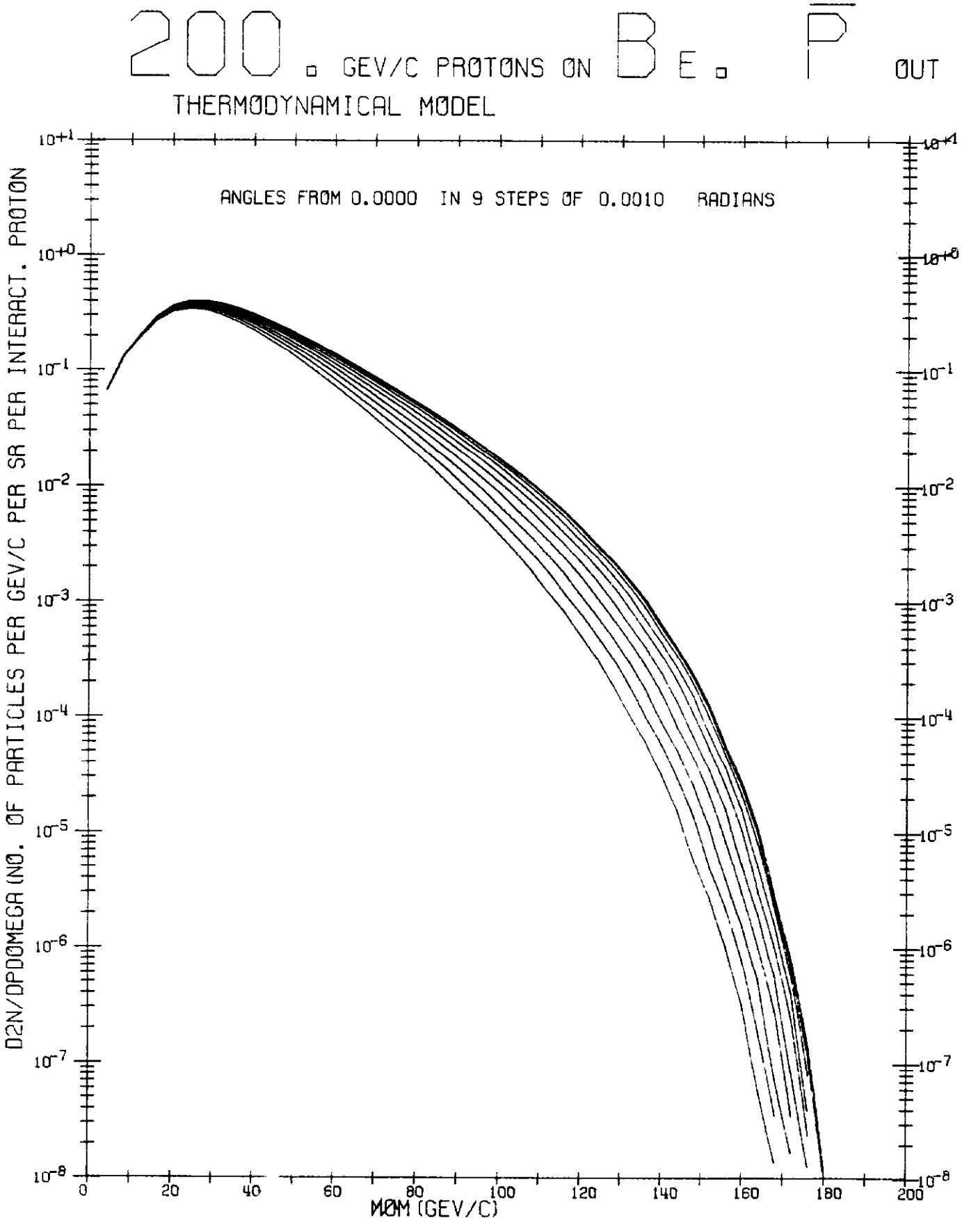

Fig. 12

1.41000 2.98600 4.80700 0.28200 15.65099 5.08200 0.76850 0.00000 0.00000 0.00000

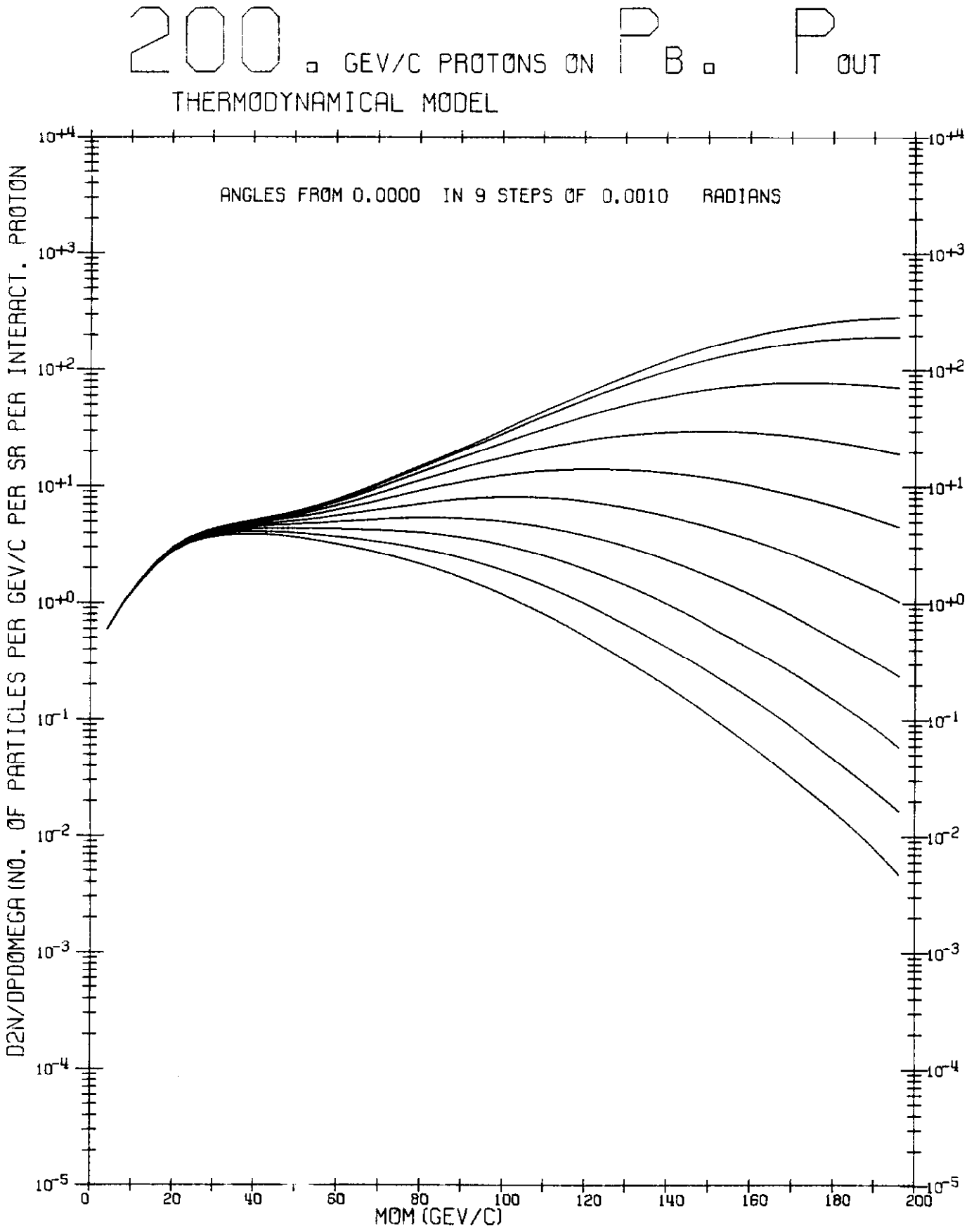

Fig. 13

1.41000 2.98600 4.80700 0.00000 15.65099 5.08200 0.76850 0.00000 0.00000 0.00000

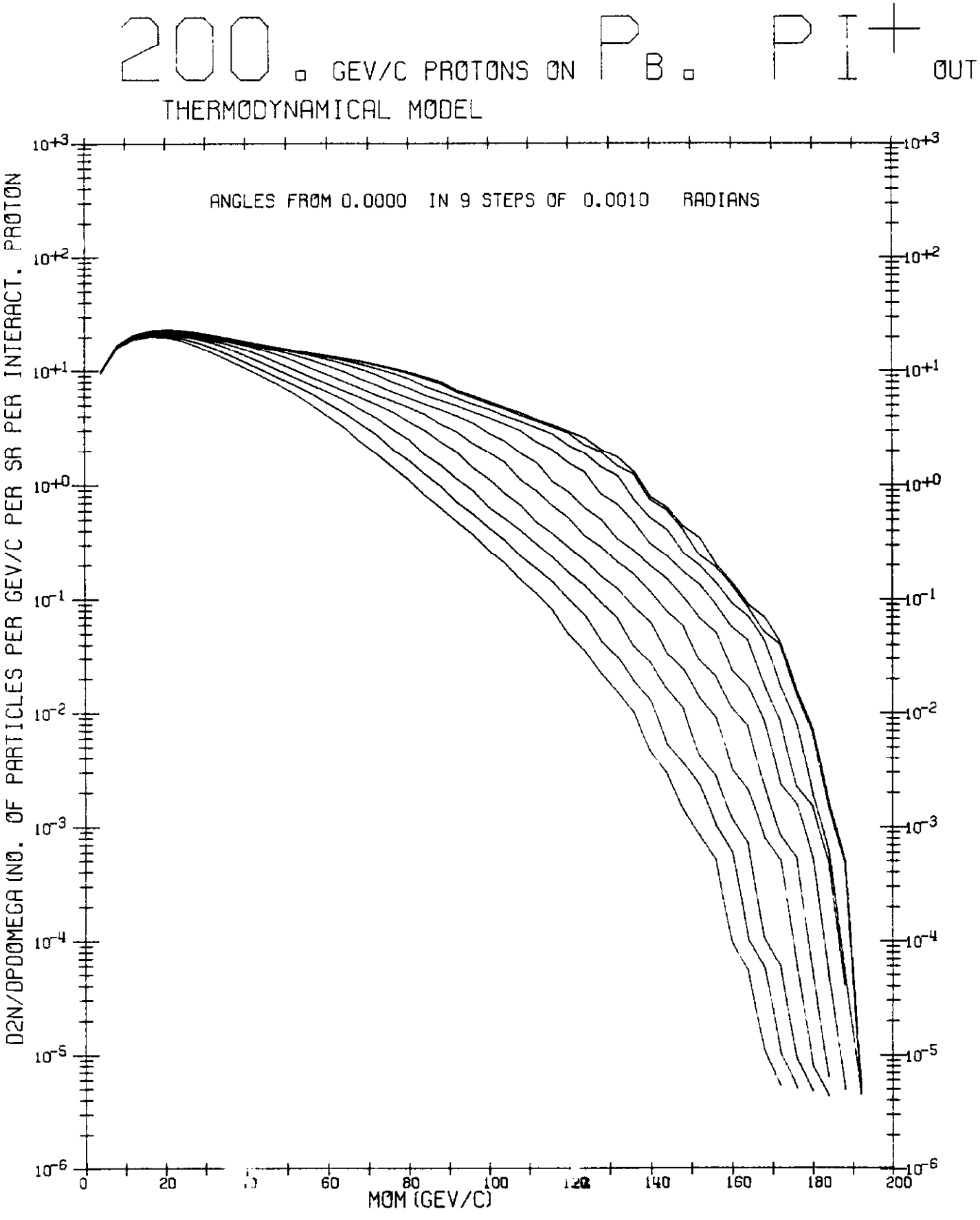

Fig. 14

2.23970 0.50000 0.00000 0.00000 4.93600 0.35470 0.64670 0.00000 0.00000 0.00000

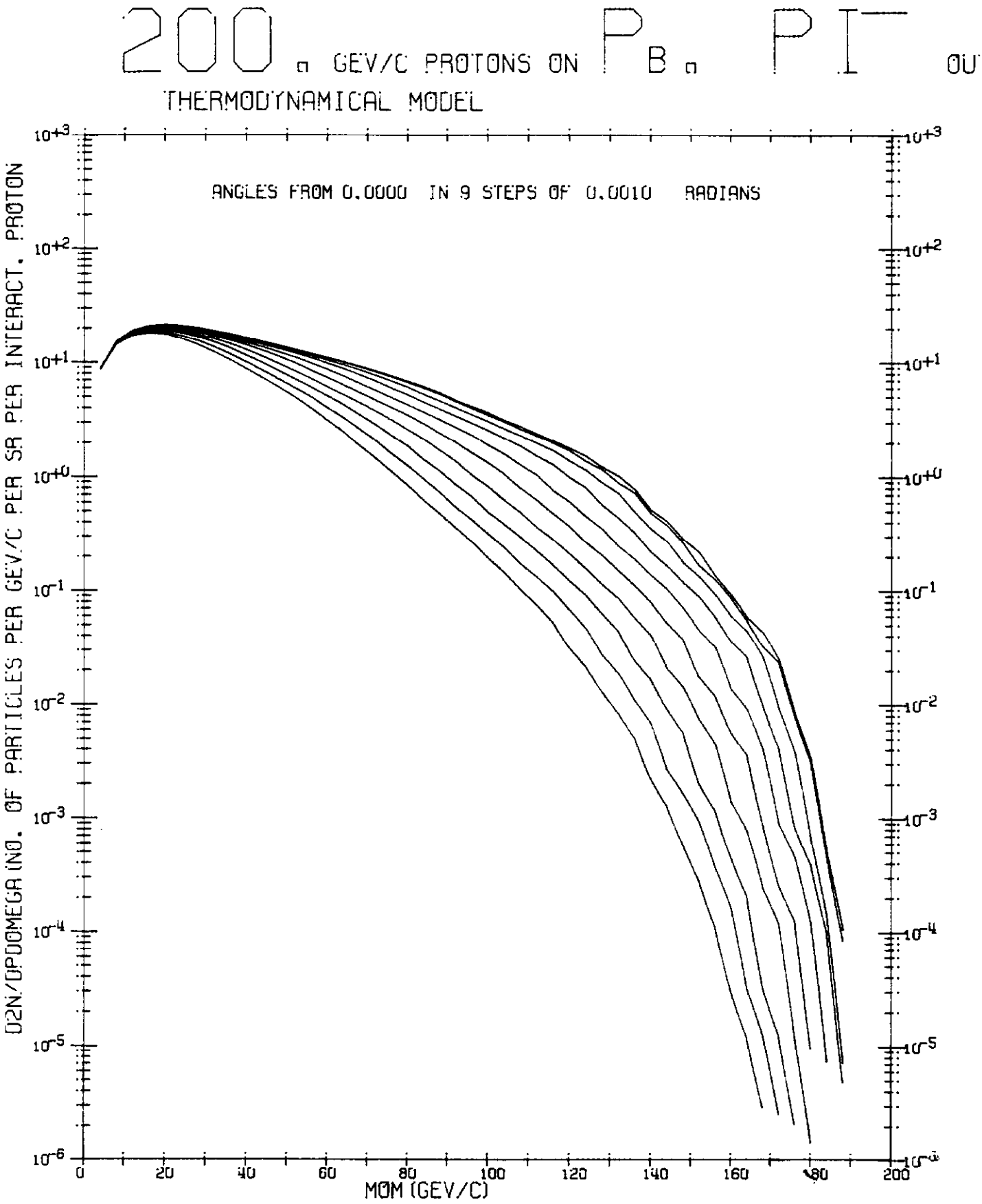

Fig. 15

2.64600 4.82300 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000

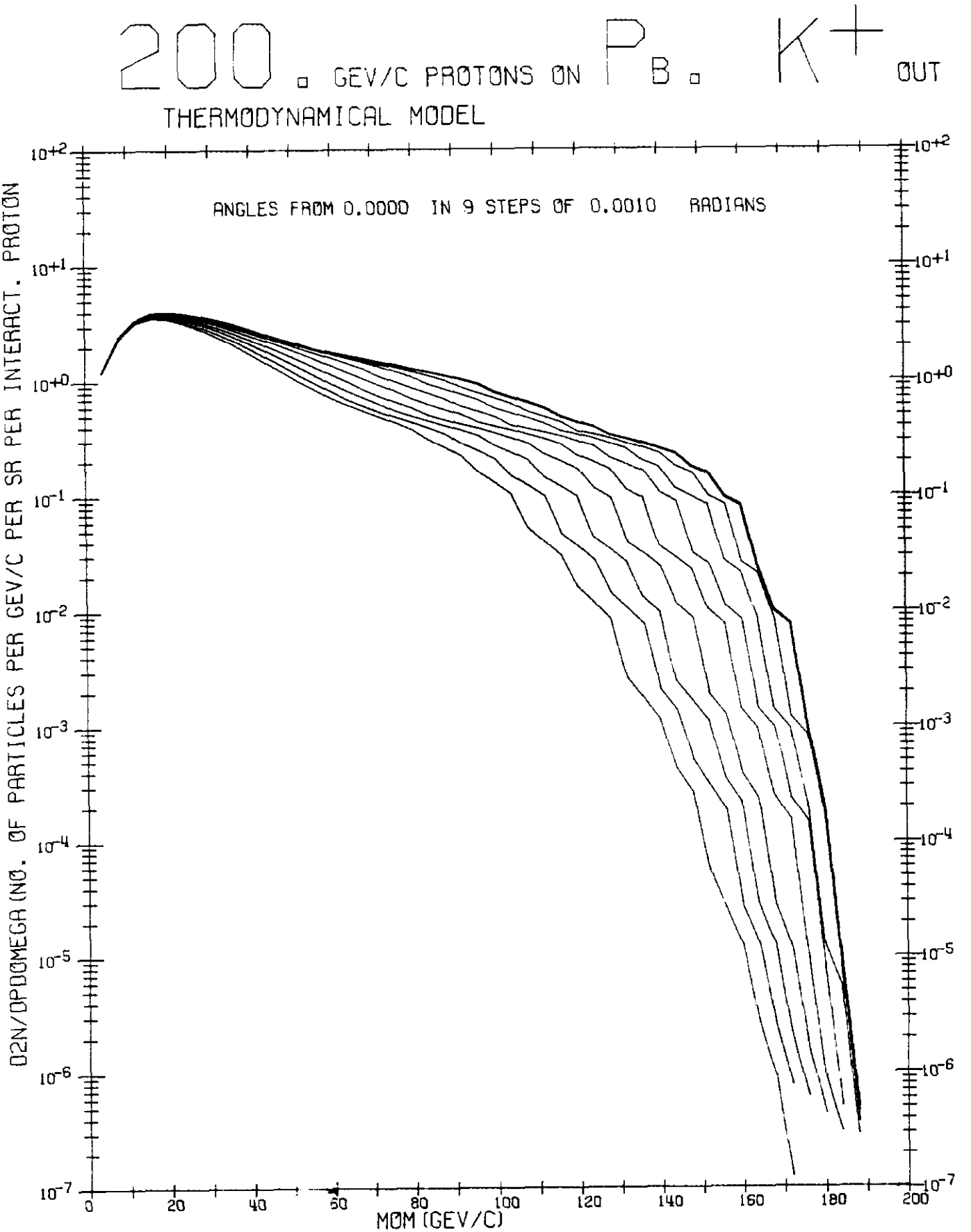

Fig. 16

0.00000 0.00000 5.34810 0.50000 4.93600 0.00000 0.64870 0.00000 0.00000 0.00000

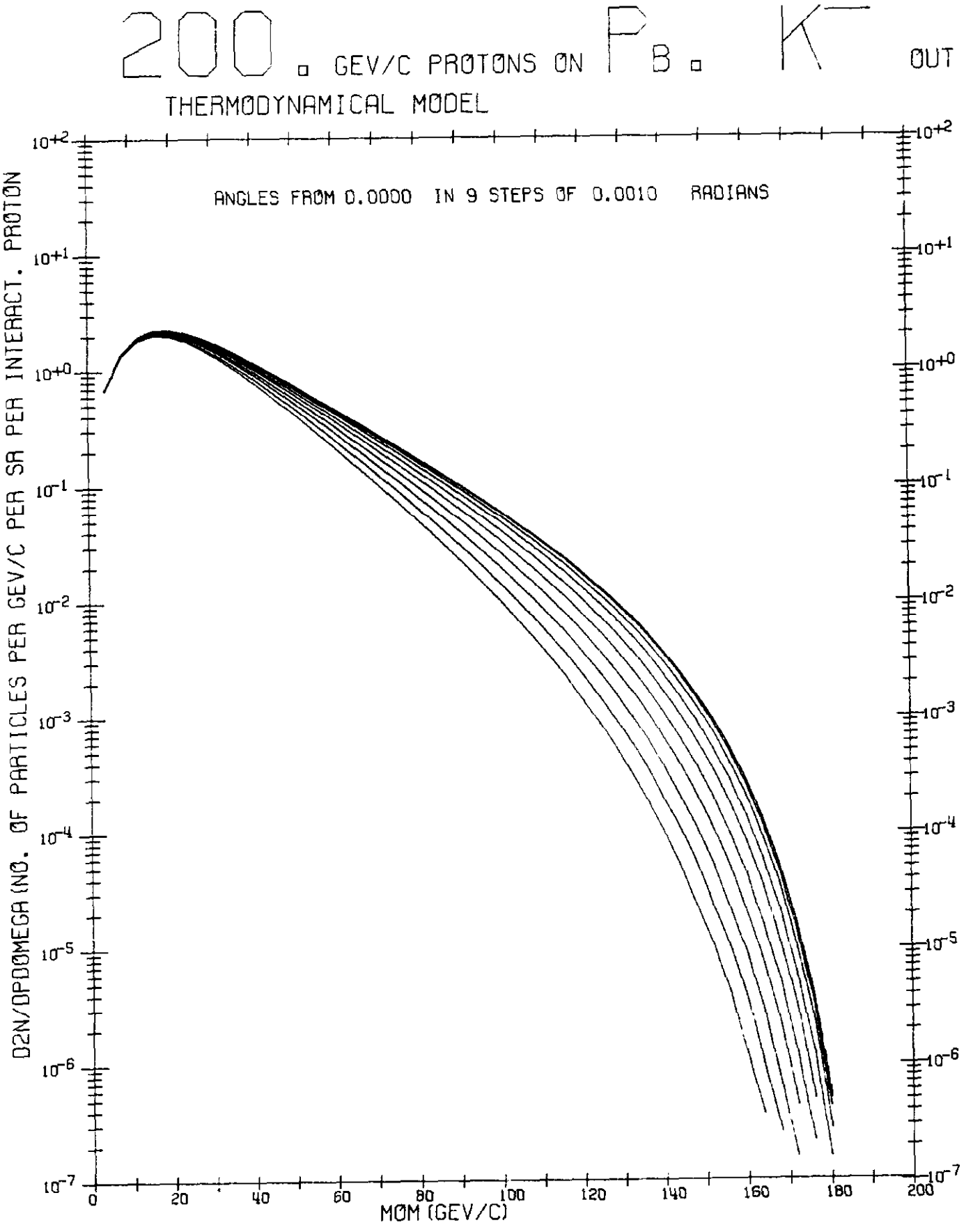

Fig. 17

0.00000 0.00000 6.12950 0.50000 4.93600 0.00000 0.64870 0.00000 0.00000 0.00000

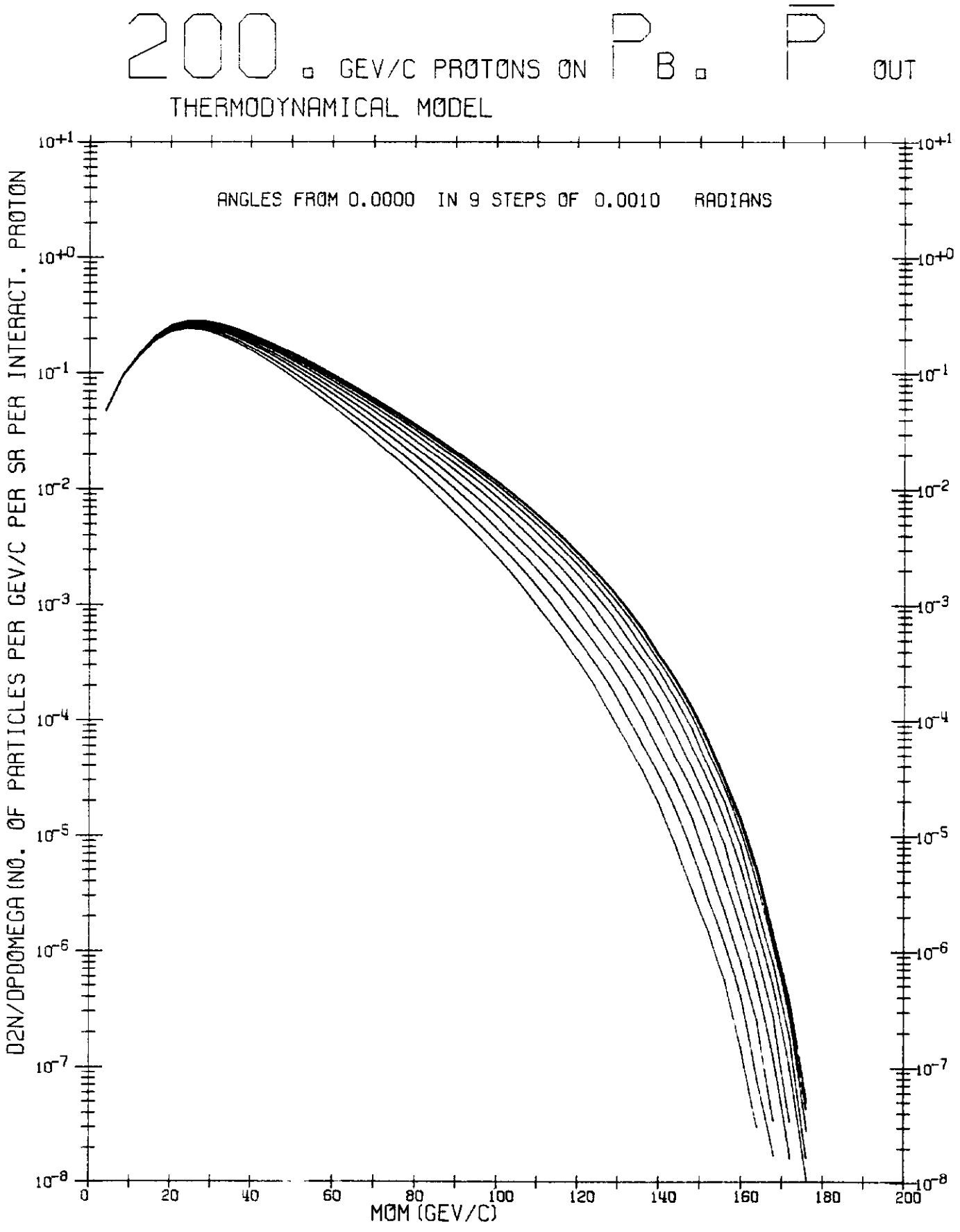

Fig. 18

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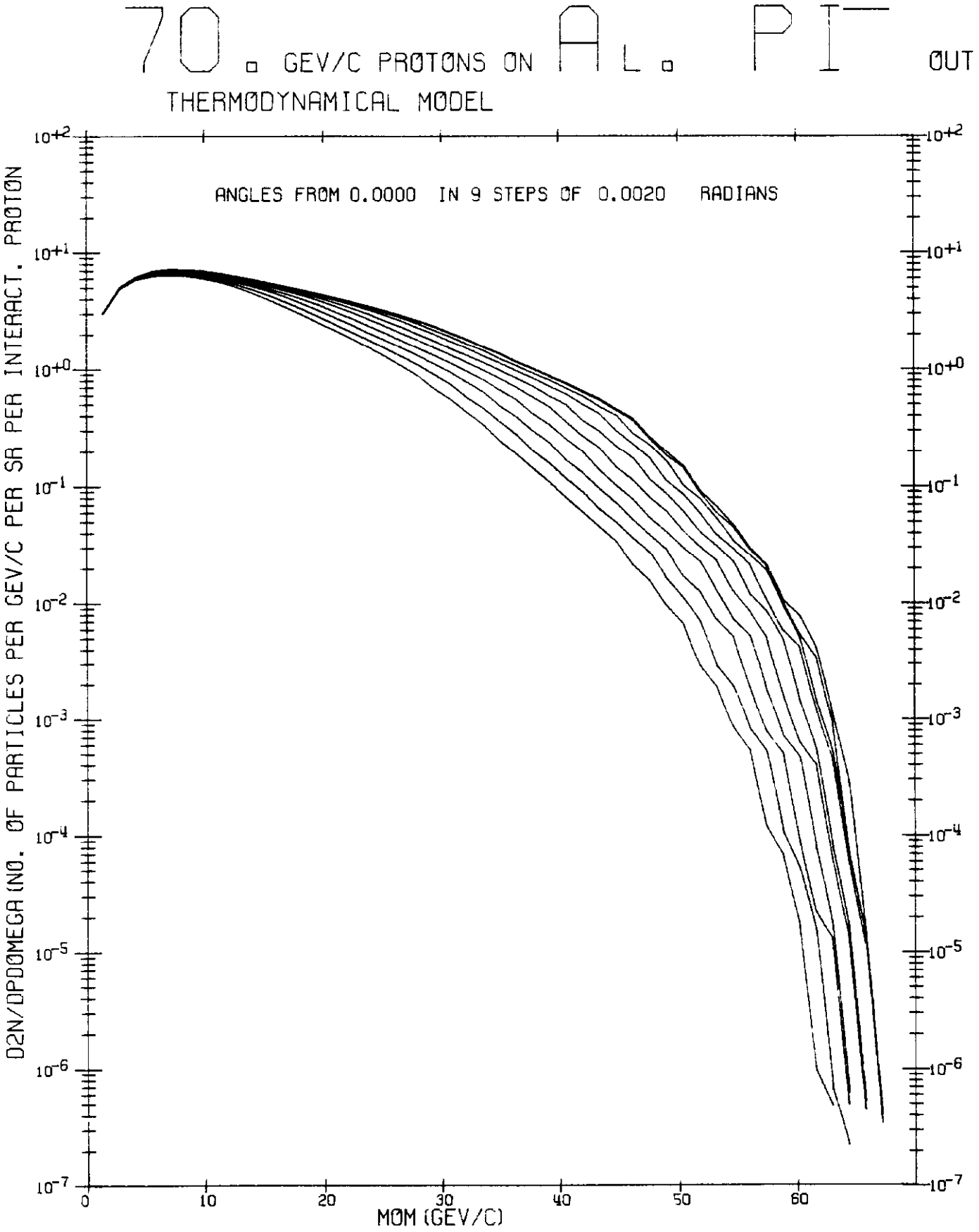

Fig. 19

0.00000 0.00000 5.43450 0.50000 4.94060 0.00000 0.57200 0.00000 0.00000 0.00000

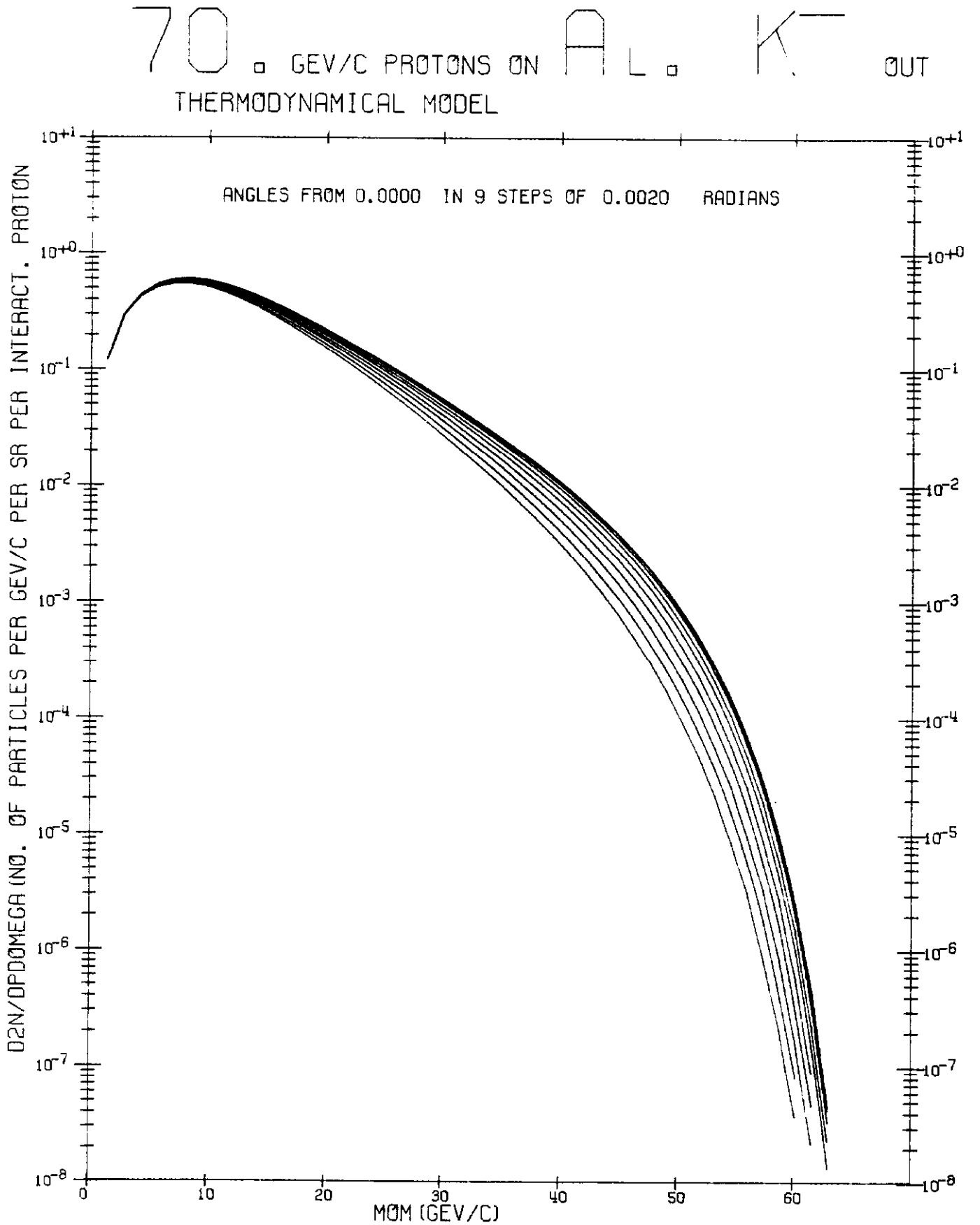

Fig. 20

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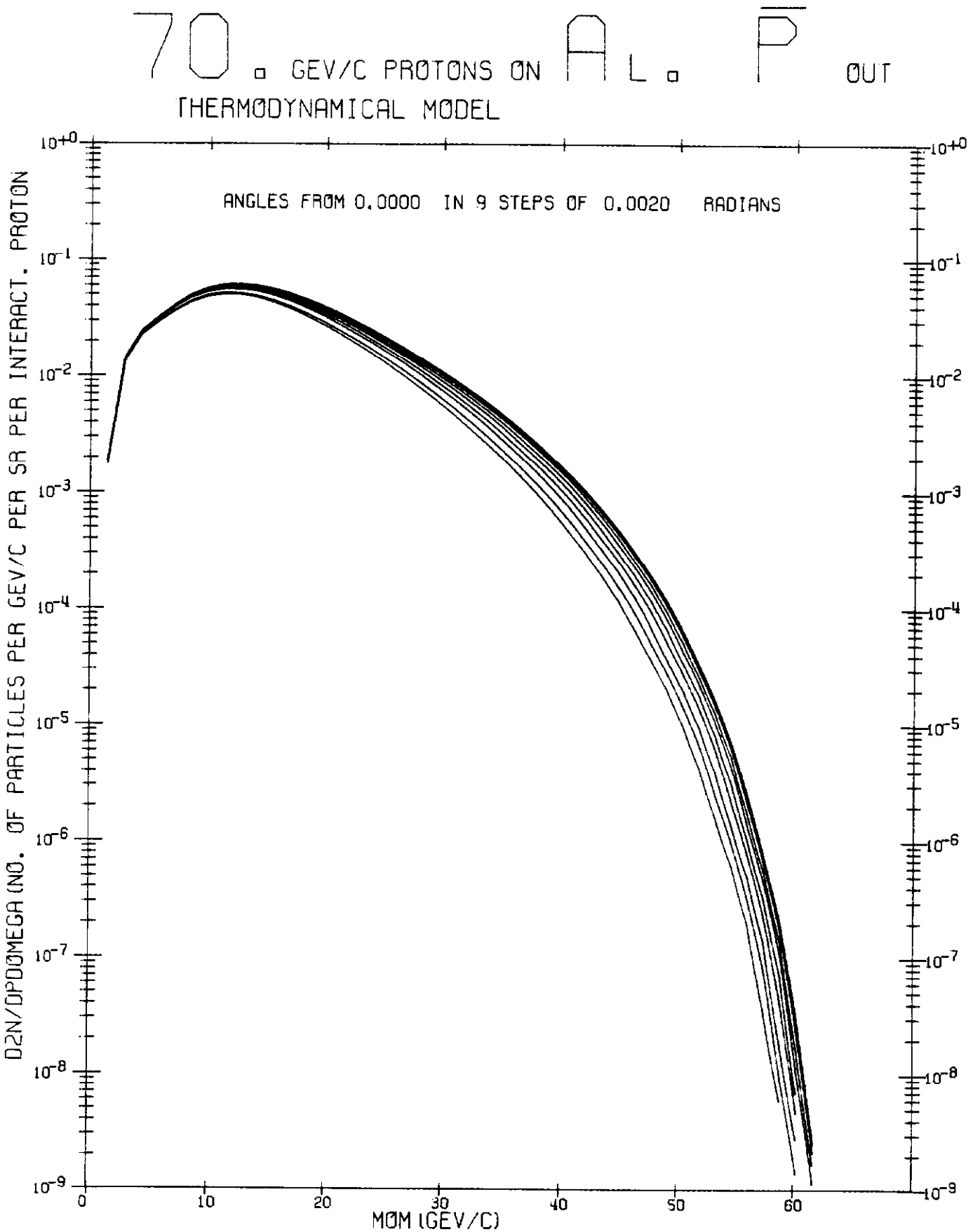

Fig. 21