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IDENTIFICATION CURVES FOR HEAVY-MESON AND HYPERON DECAYS

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IDENTIFICATION CURVES FOR HEAVY-MESON  
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HEAVY-MESON AND HYPERON DECAYS

Howard S. White

September 19, 1956

**IDENTIFICATION CURVES FOR  
HEAVY-MESON AND HYPERON DECAYS**

Howard S. White

Radiation Laboratory  
University of California  
Berkeley, California

September 19, 1956

**ABSTRACT**

Curves are presented for the purpose of facilitating identification of heavy-meson and hyperon decays.

## IDENTIFICATION CURVES FOR HEAVY-MESON AND HYPERON DECAYS

Howard S. White

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Berkeley, California

September 19, 1956

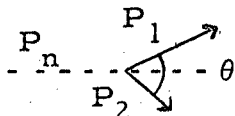
The curves contained in this report were designed to facilitate the rapid identification of a primary particle which is observed to decay into two particles within a cloud chamber or similar experimental medium. The momentum vectors of the two charged particles involved and the angle included between the vectors will usually be measurable. An assumption as to the identity of the particles involved may immediately be determined to be either consistent or inconsistent with the observed momenta and angle by reference to the appropriate graph.

The kinematic properties of the decay of either a neutral or charged primary may be used to derive the equation

$$E_1 E_2 - P_1 P_2 \cos \theta = C,$$

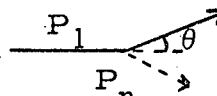
where the meaning of the quantities is indicated below for the separate cases of a neutral and a charged primary.

Neutral Primary



$$C = \frac{1}{2} (M_n^2 - M_1^2 - M_2^2)$$

Charged Primary



$$C = \frac{1}{2} (M_1^2 + M_2^2 - M_n^2)$$

Throughout this report, the units are expressed as Bev for energy, and Bev/c for momentum. The masses used for the different particles are given in Table I.

The evaluation of the equation to find the plotted points was performed on the IBM Type 650 machine at Livermore.

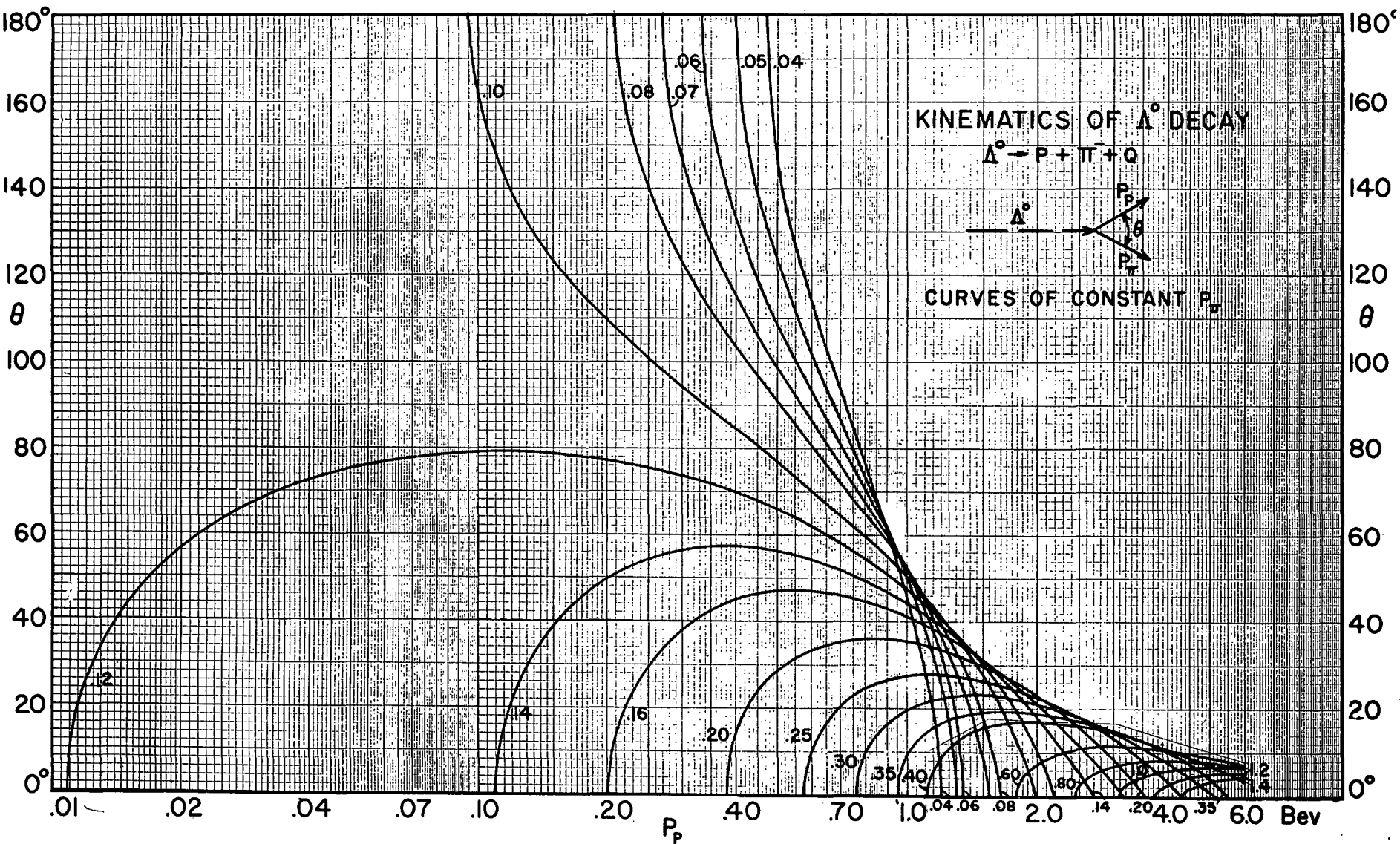
This work was undertaken at the suggestion of William B. Fowler. The table of masses was furnished by George Maenchen, and much of the drafting was done by Arthur Kemalyan and Mrs. Ruth Miller.

This work was done under the auspices of the U. S. Atomic Energy Commission.

Table I

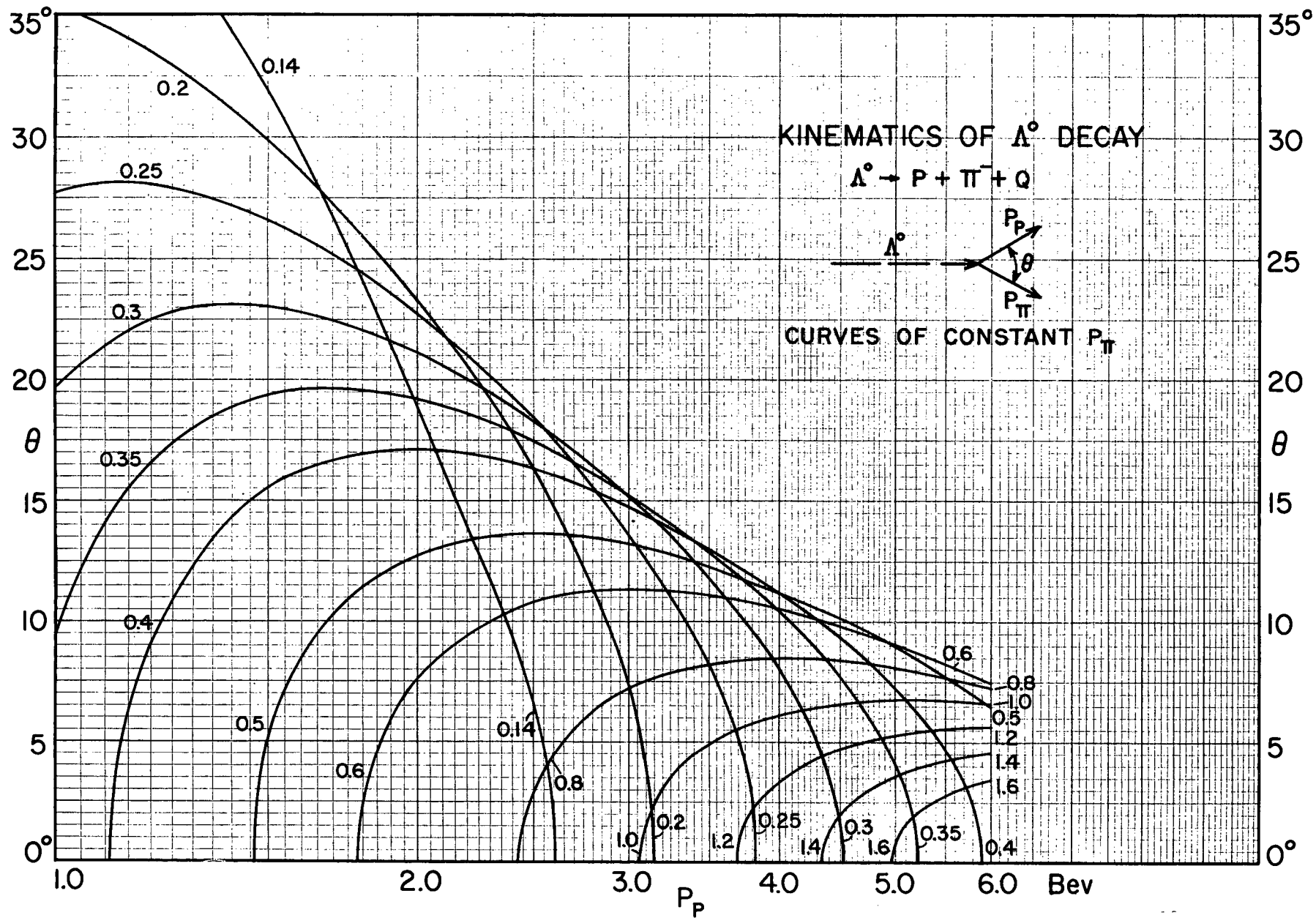
Masses Used in the Calculations

Particle	Mass (Bev.)	Particle	Mass (Bev.)
$\mu$	0.10572	p	0.93823
$\pi^0$	0.13505	n	0.93953
$\pi^\pm$	0.13955	$\Lambda^0$	1.11470
$\theta^0, K^\pm$	0.49336	$\Sigma^+$	1.18906
		$\Xi^-$	1.3182

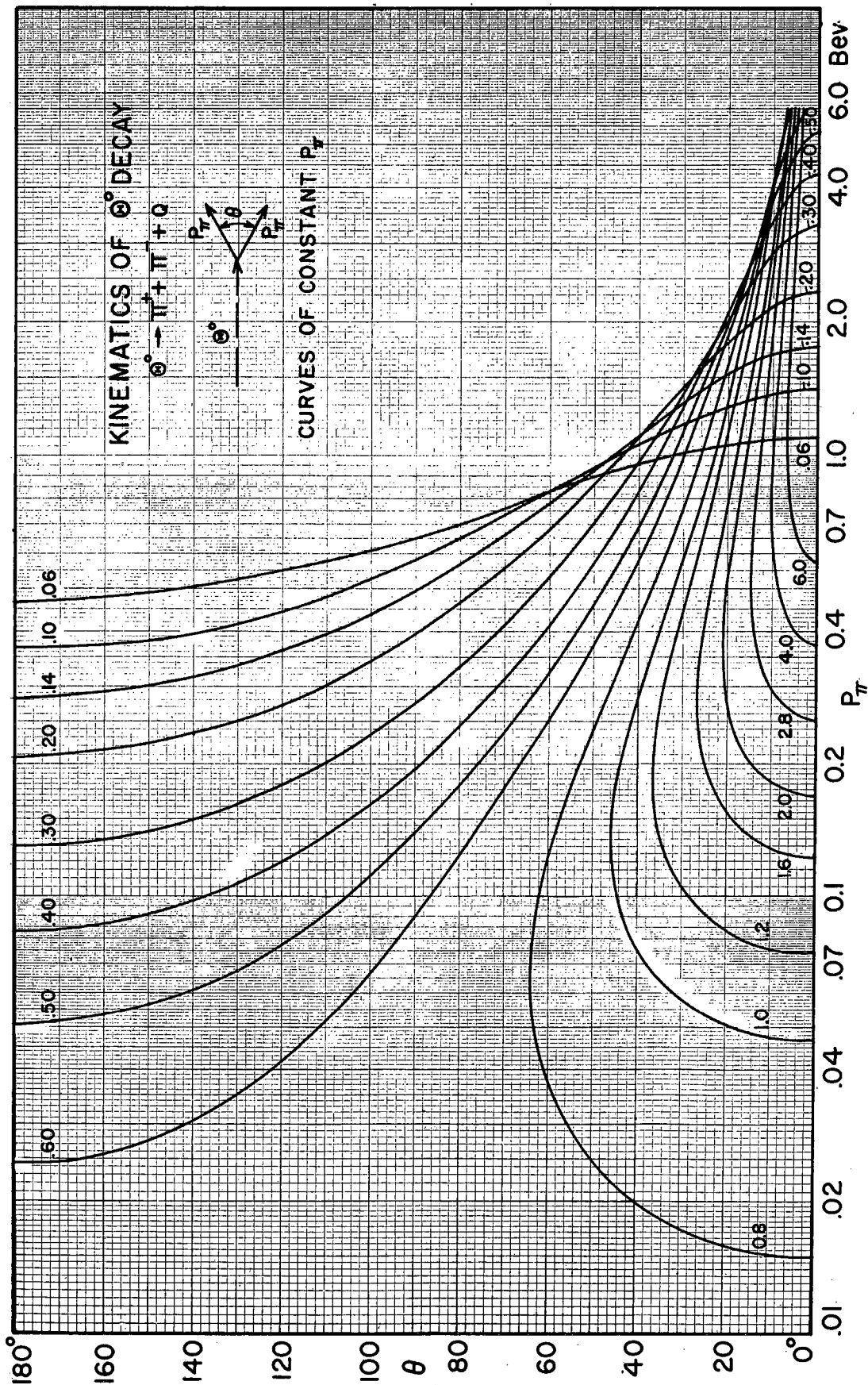


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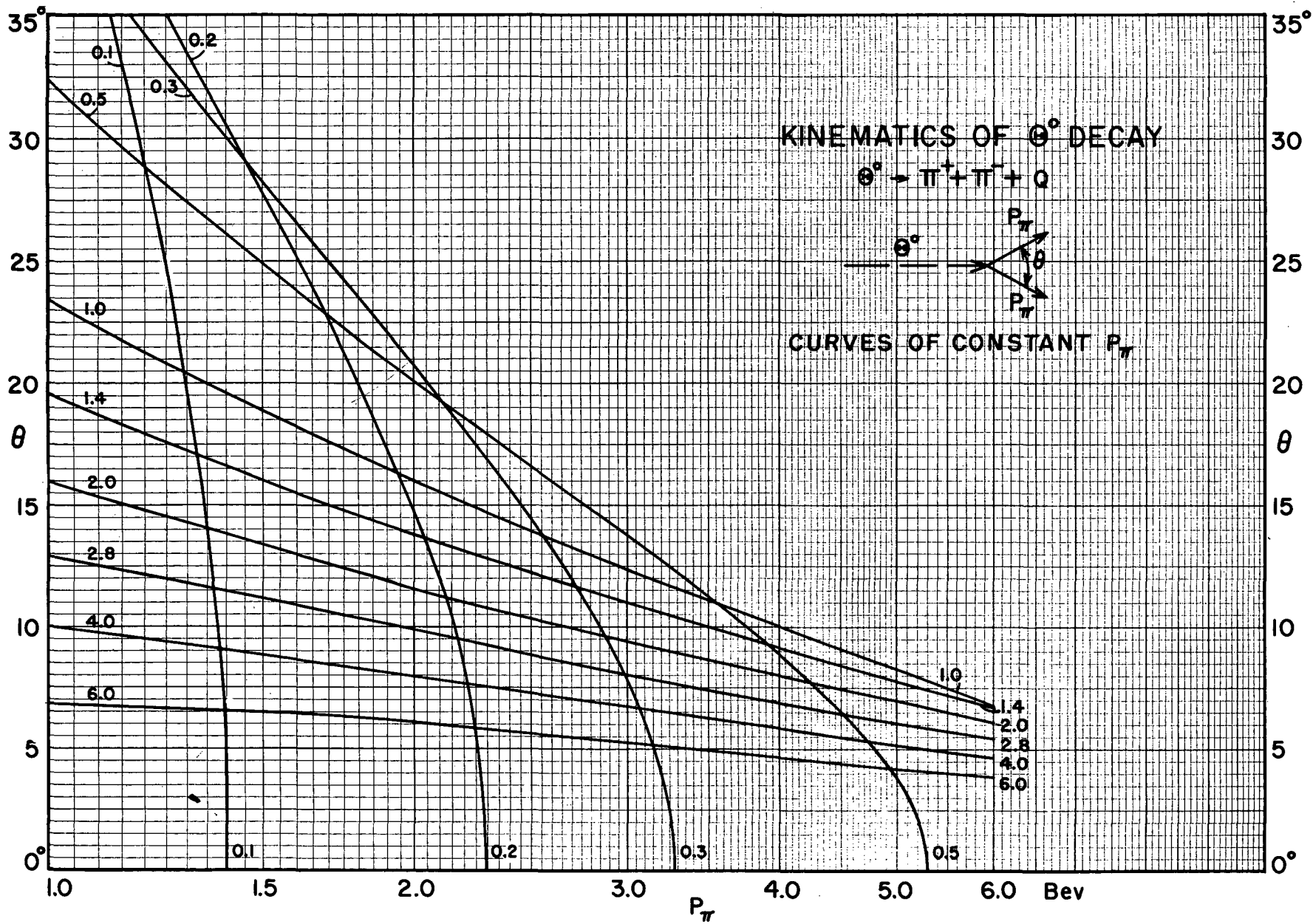




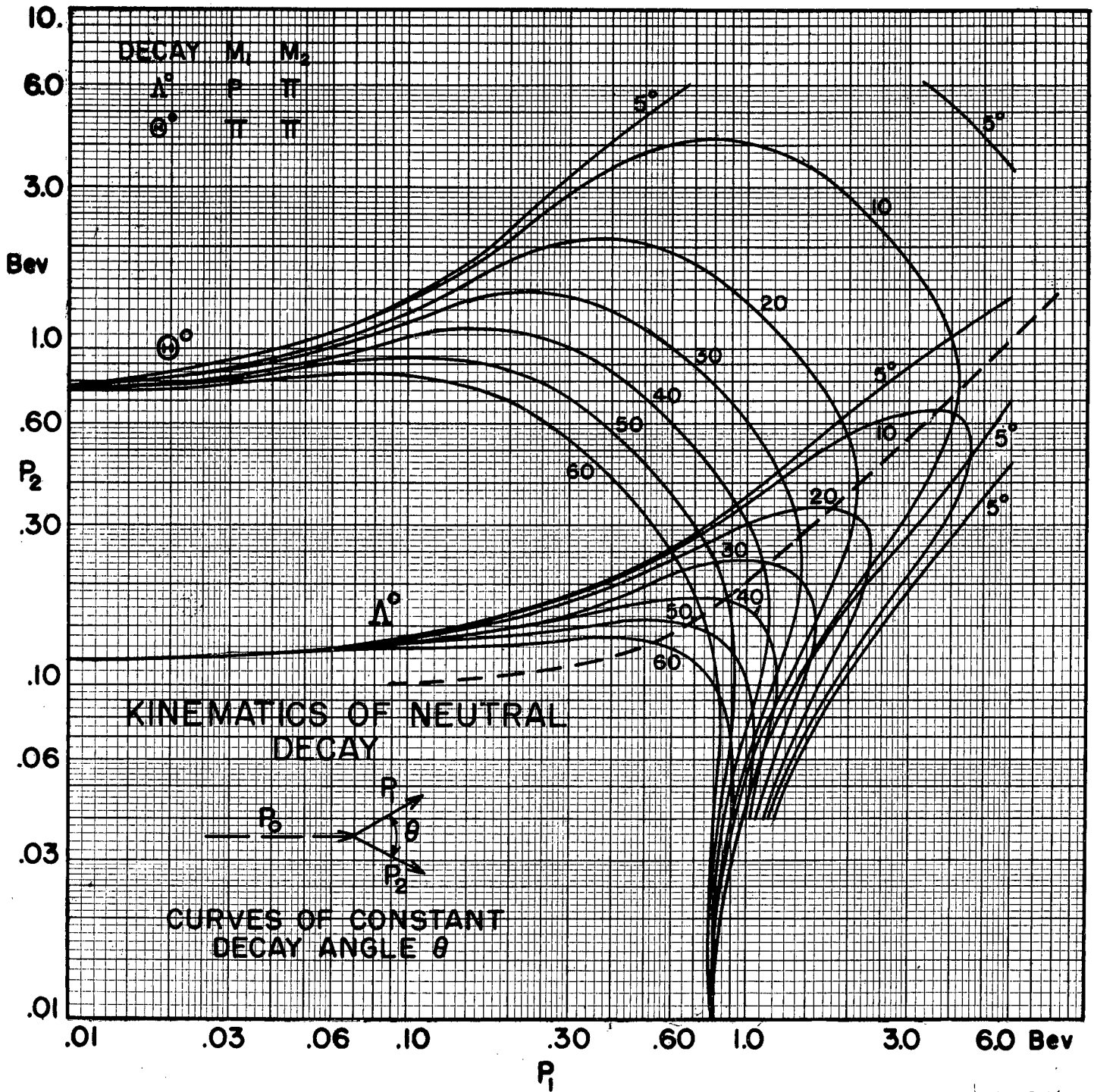
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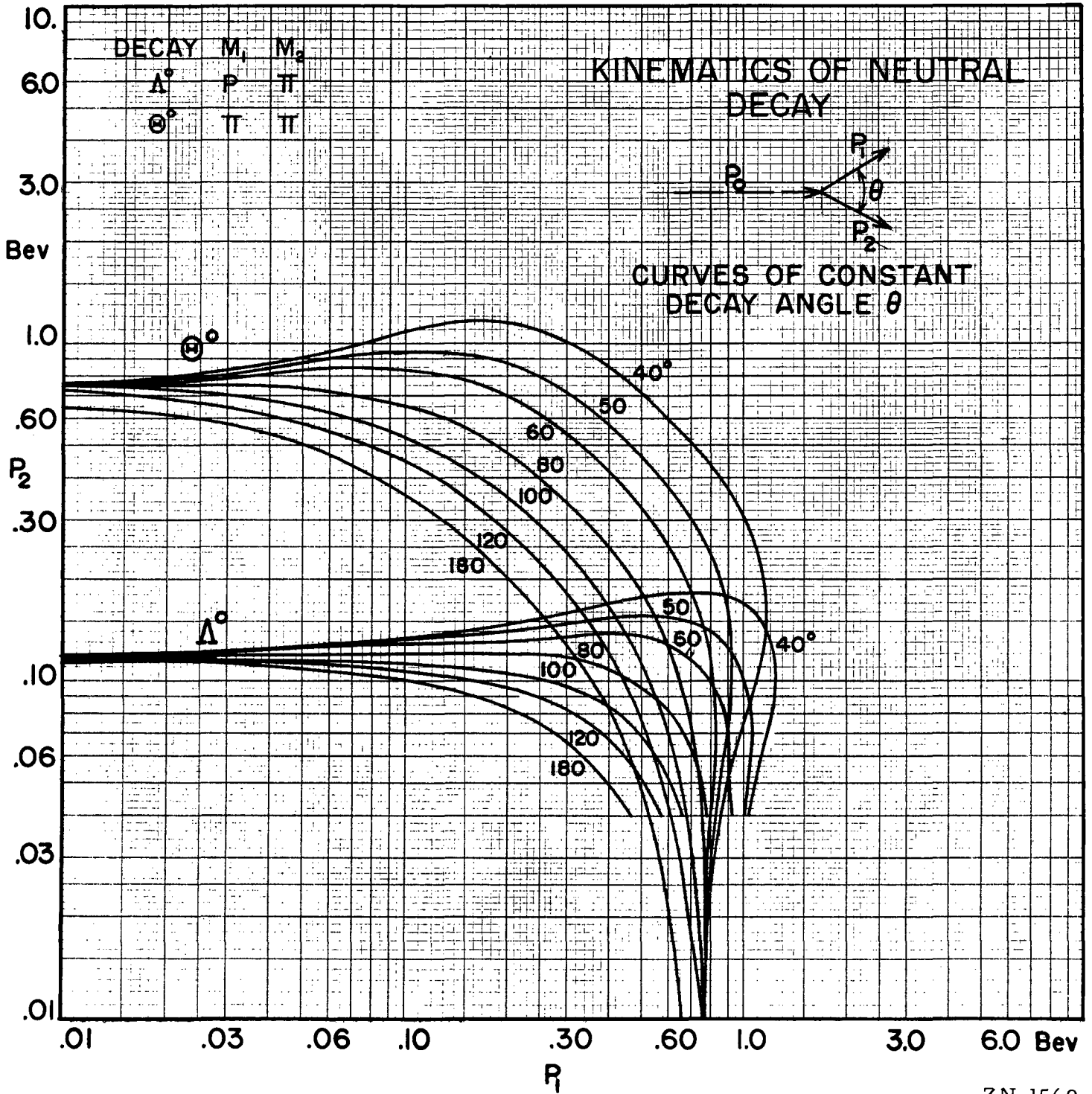


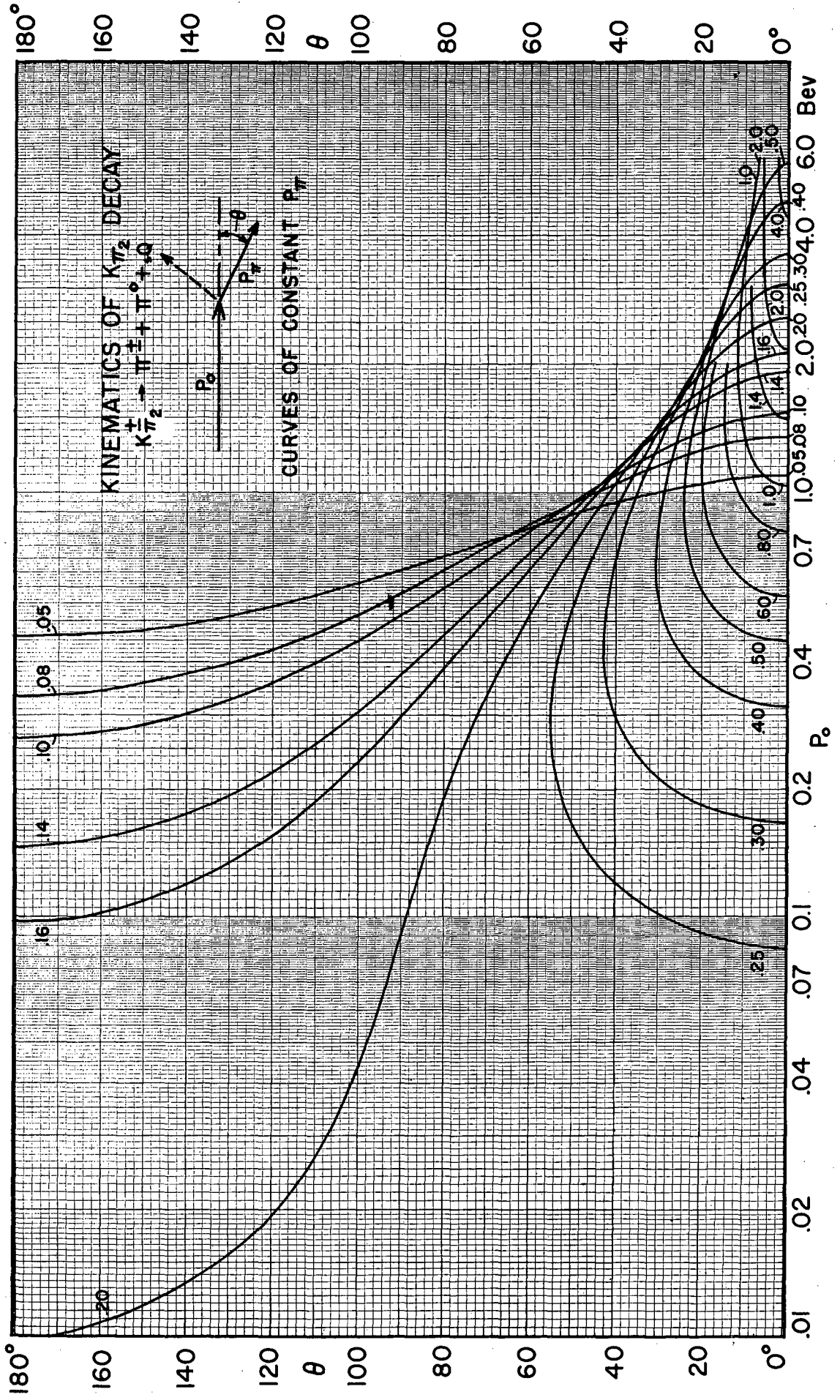
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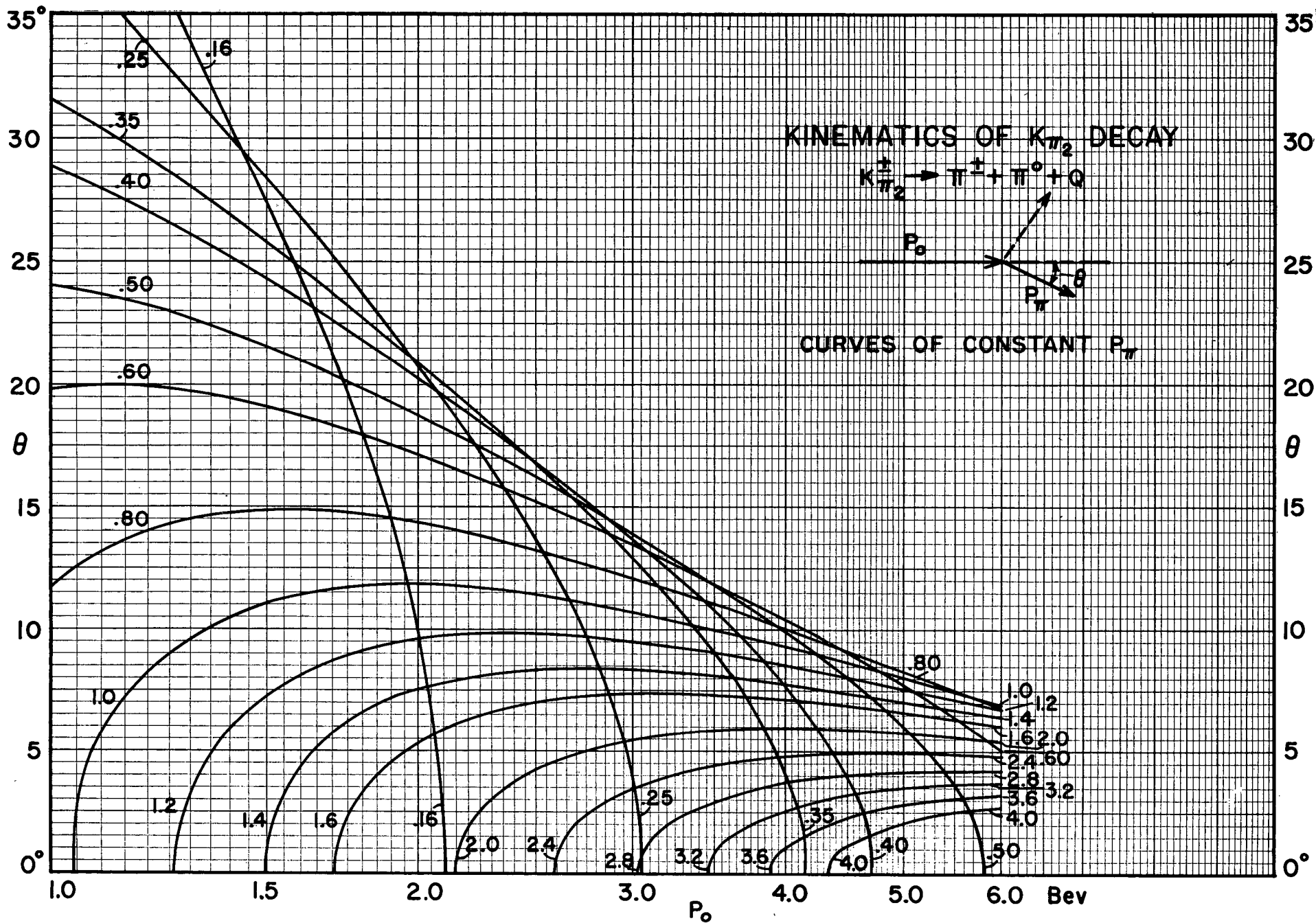
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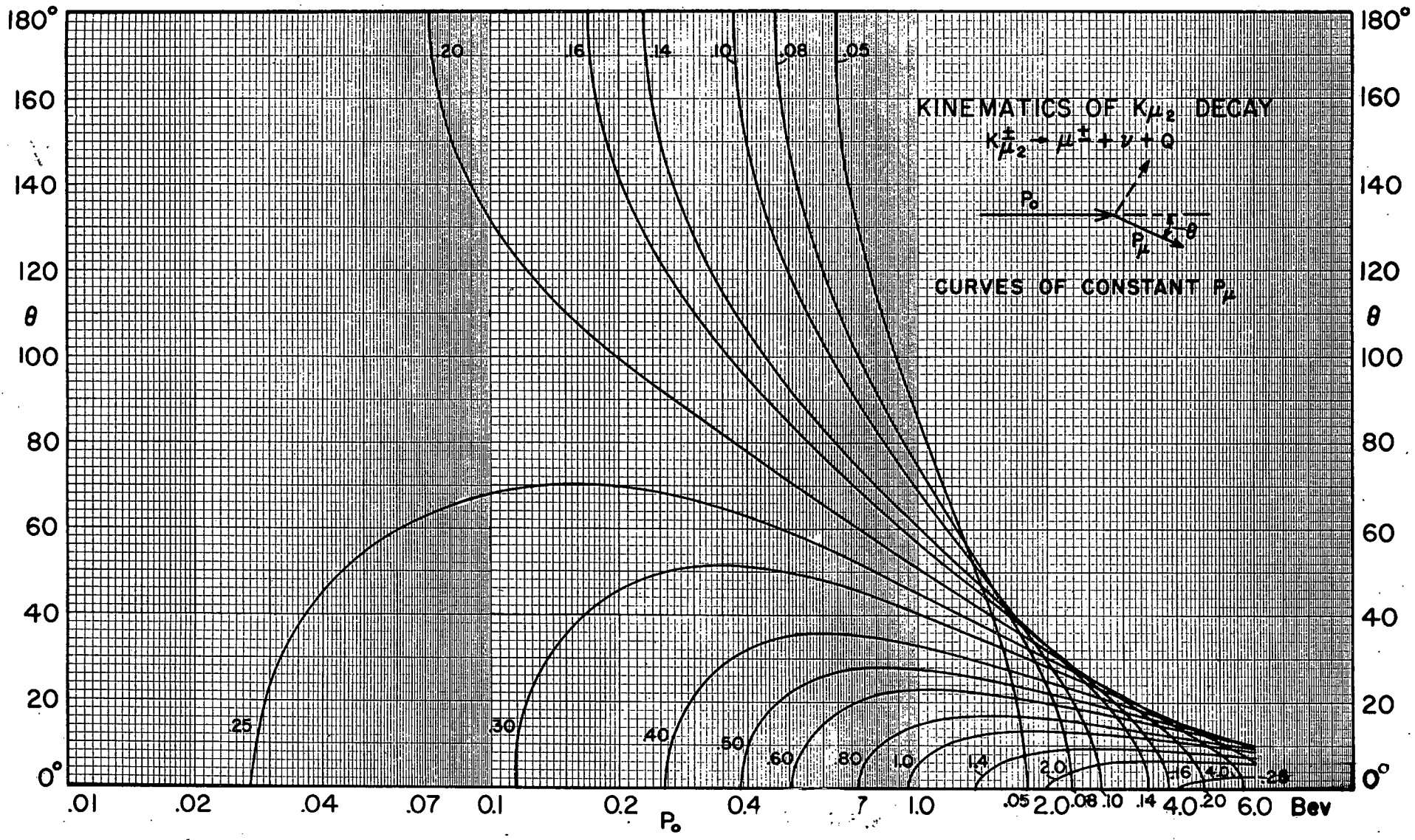






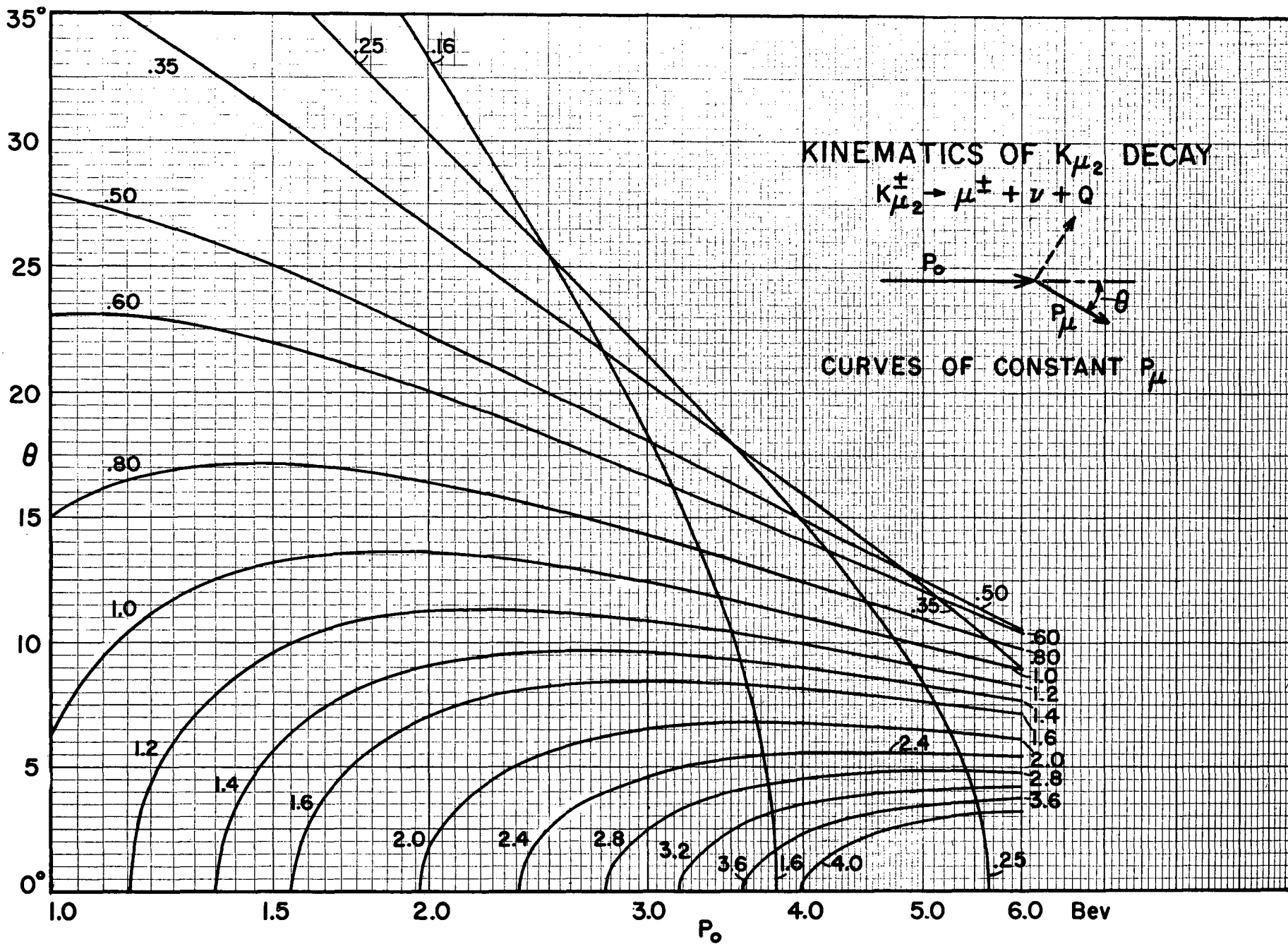
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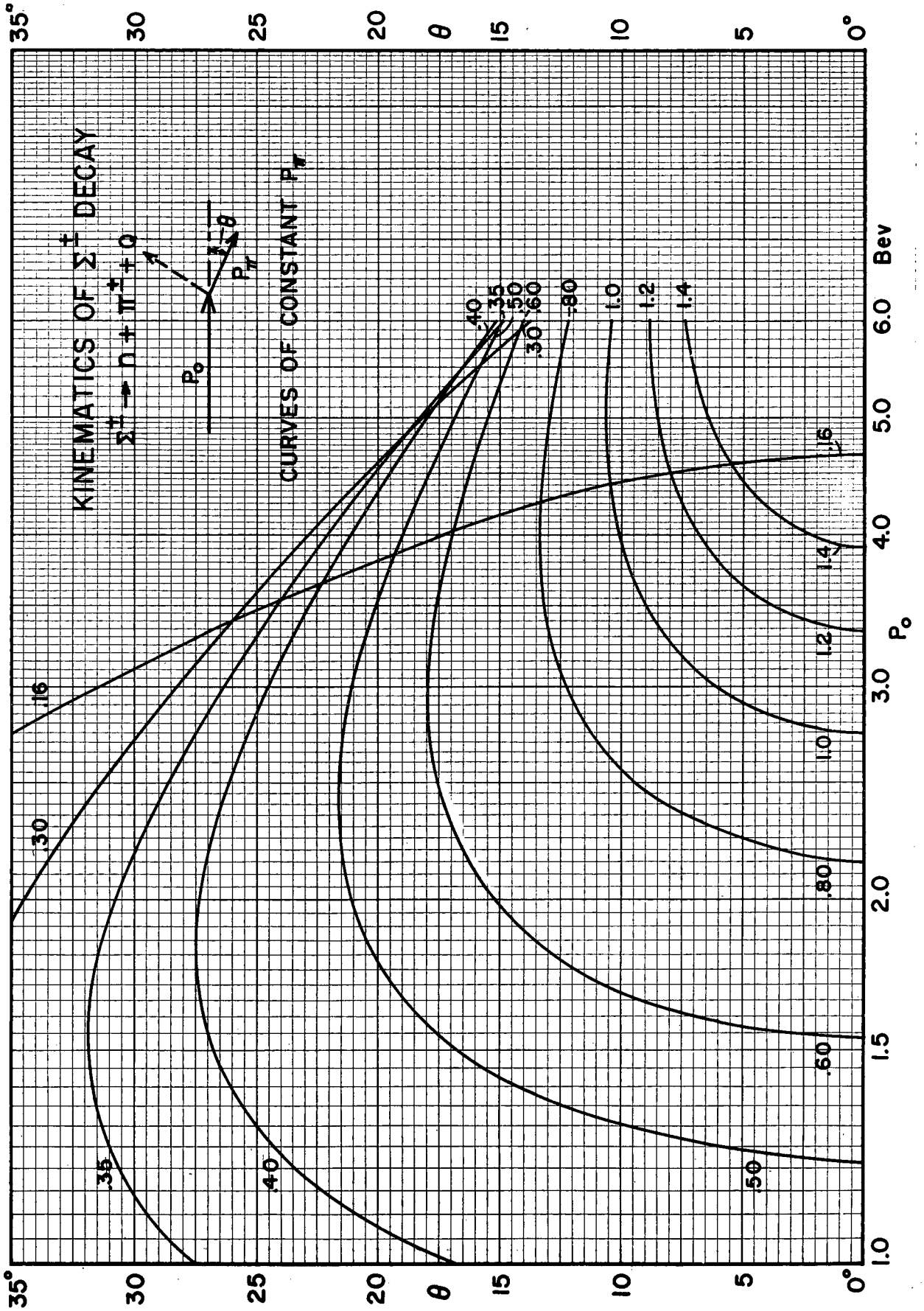


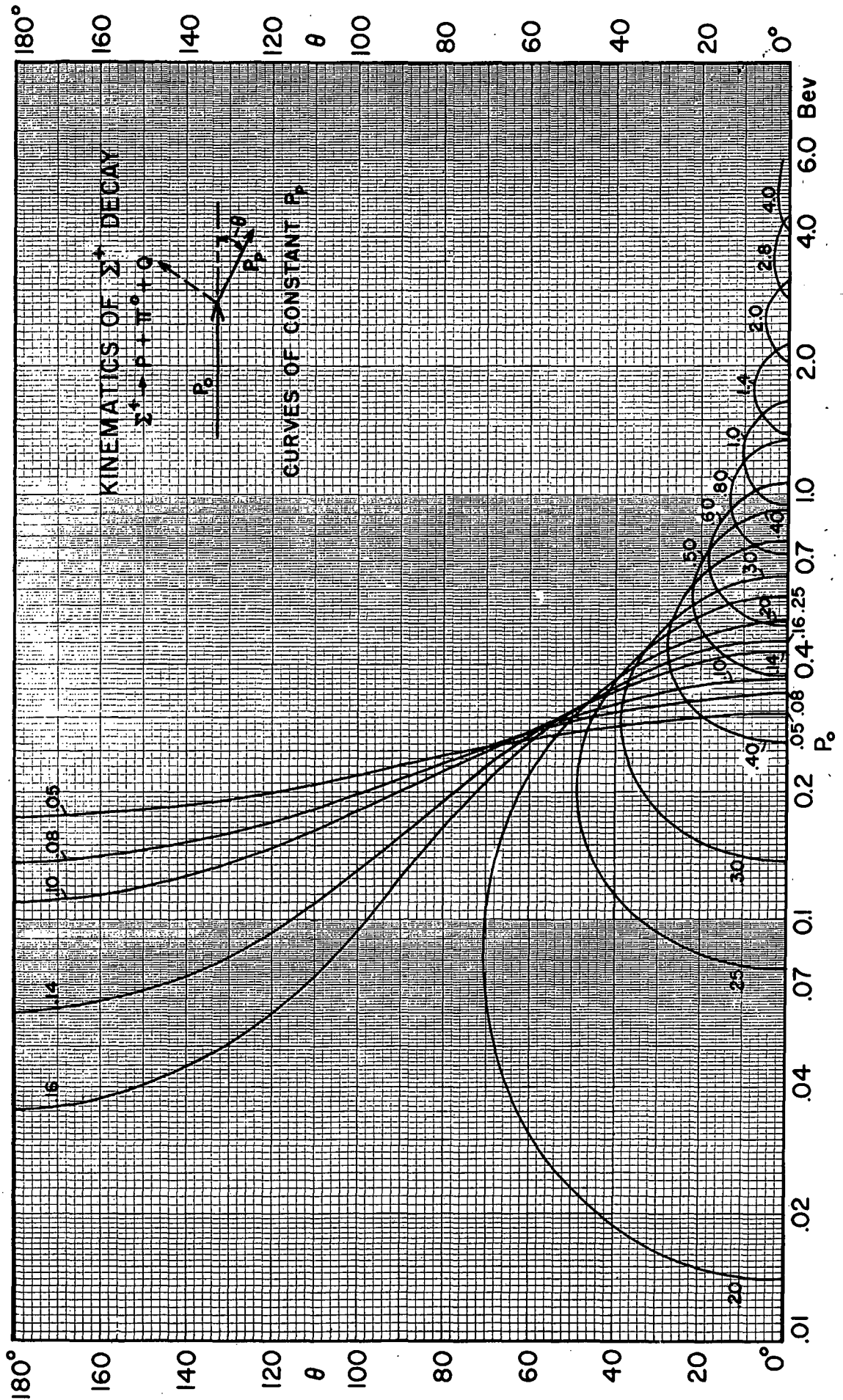
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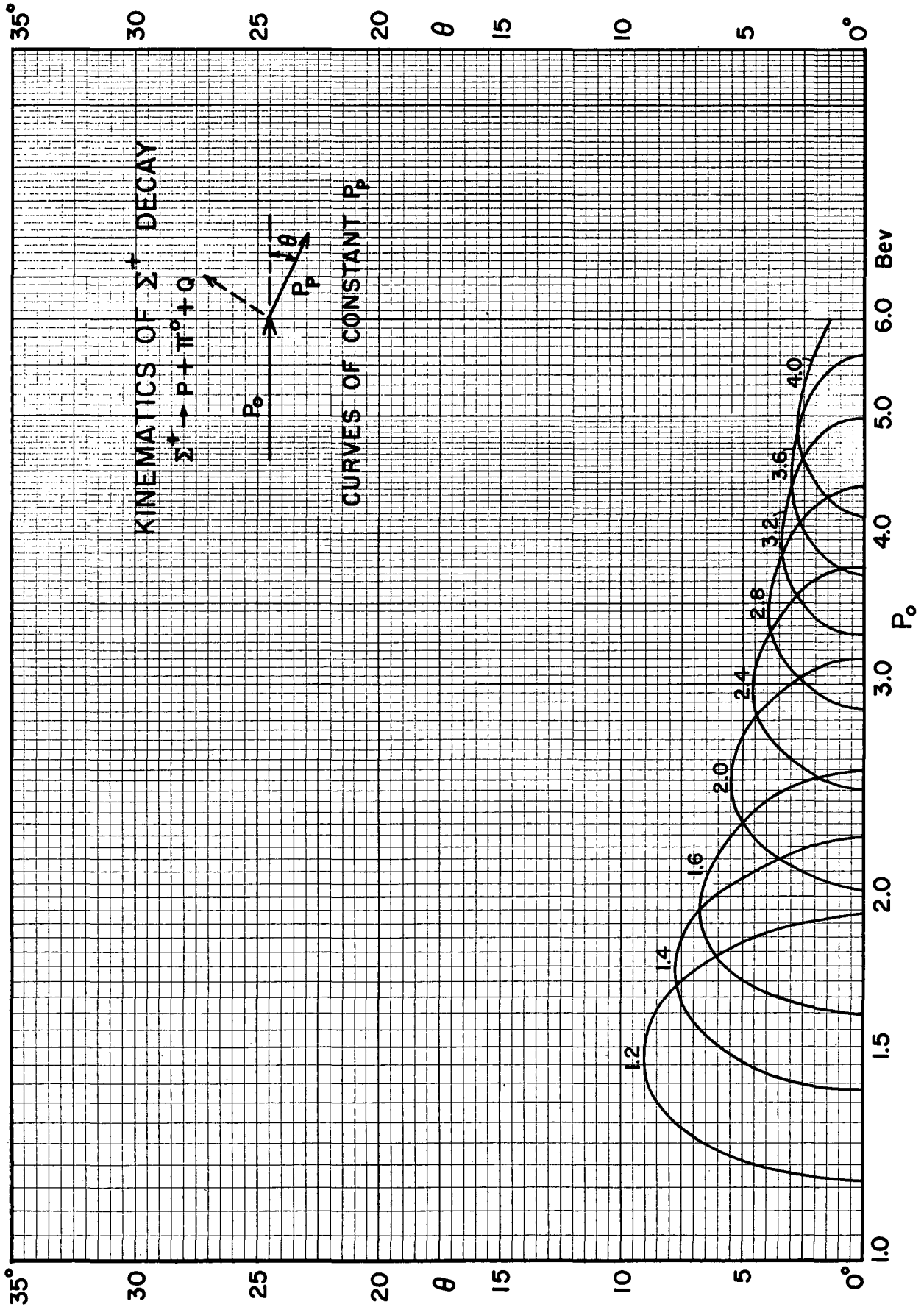




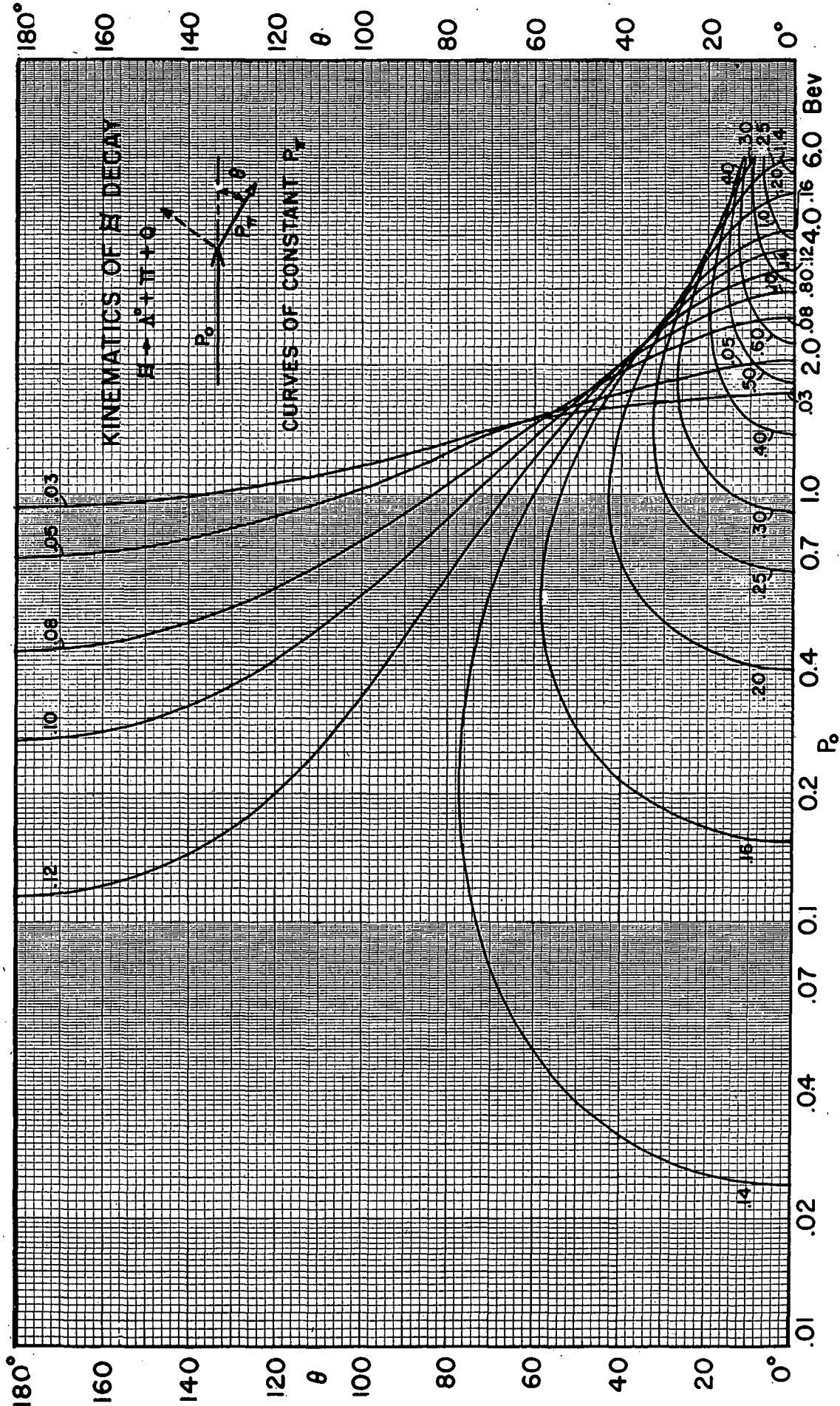




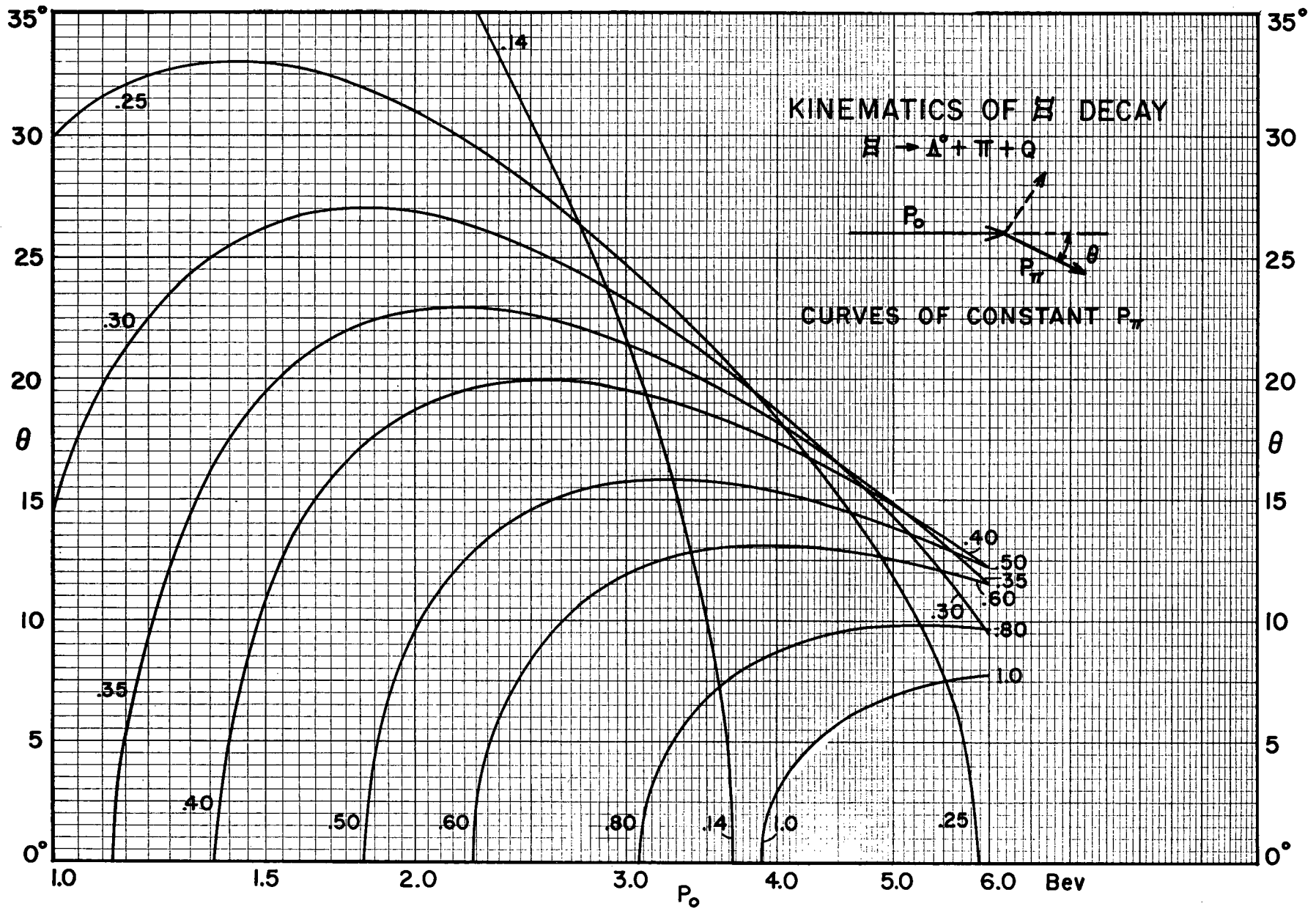
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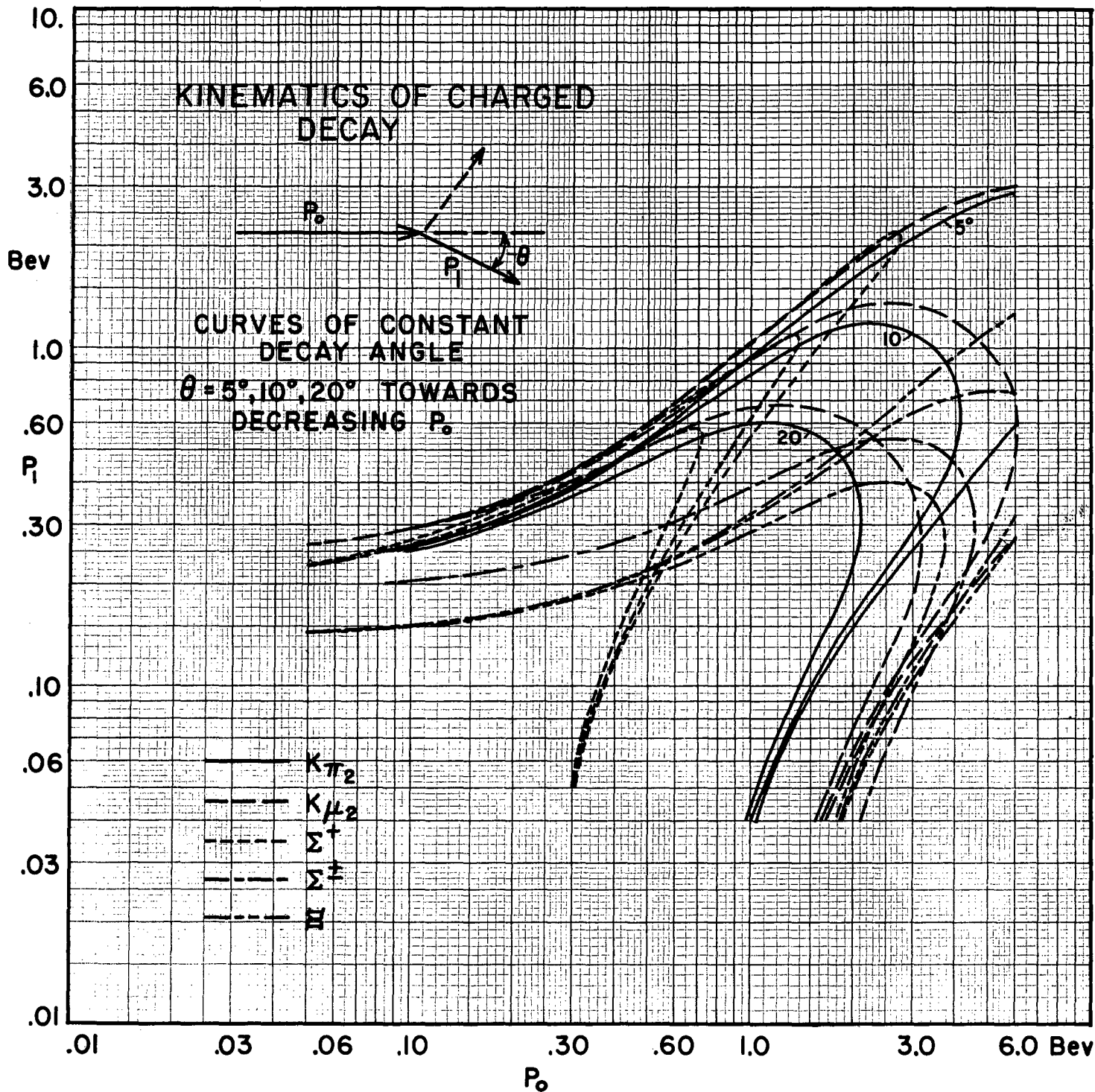
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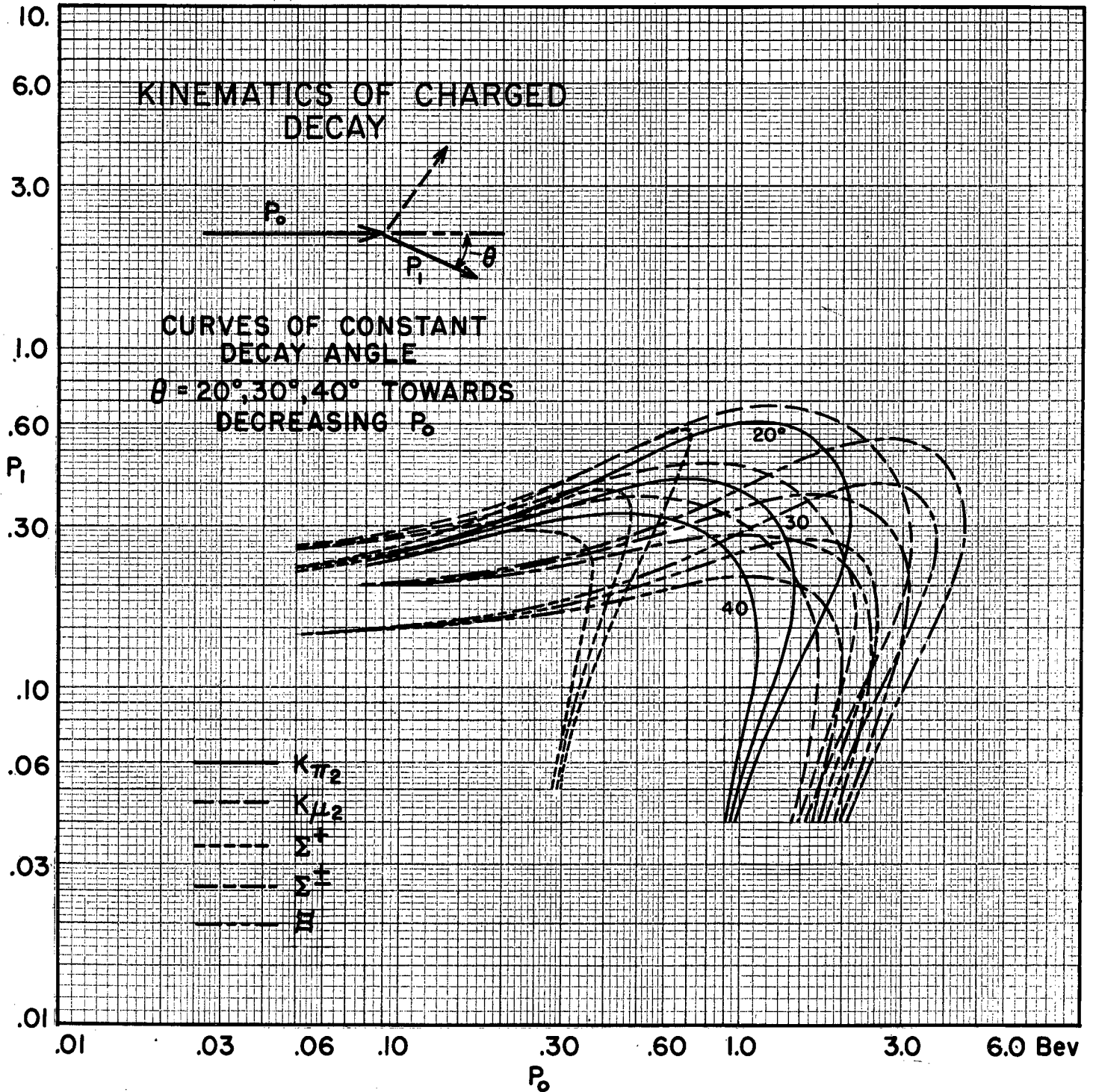


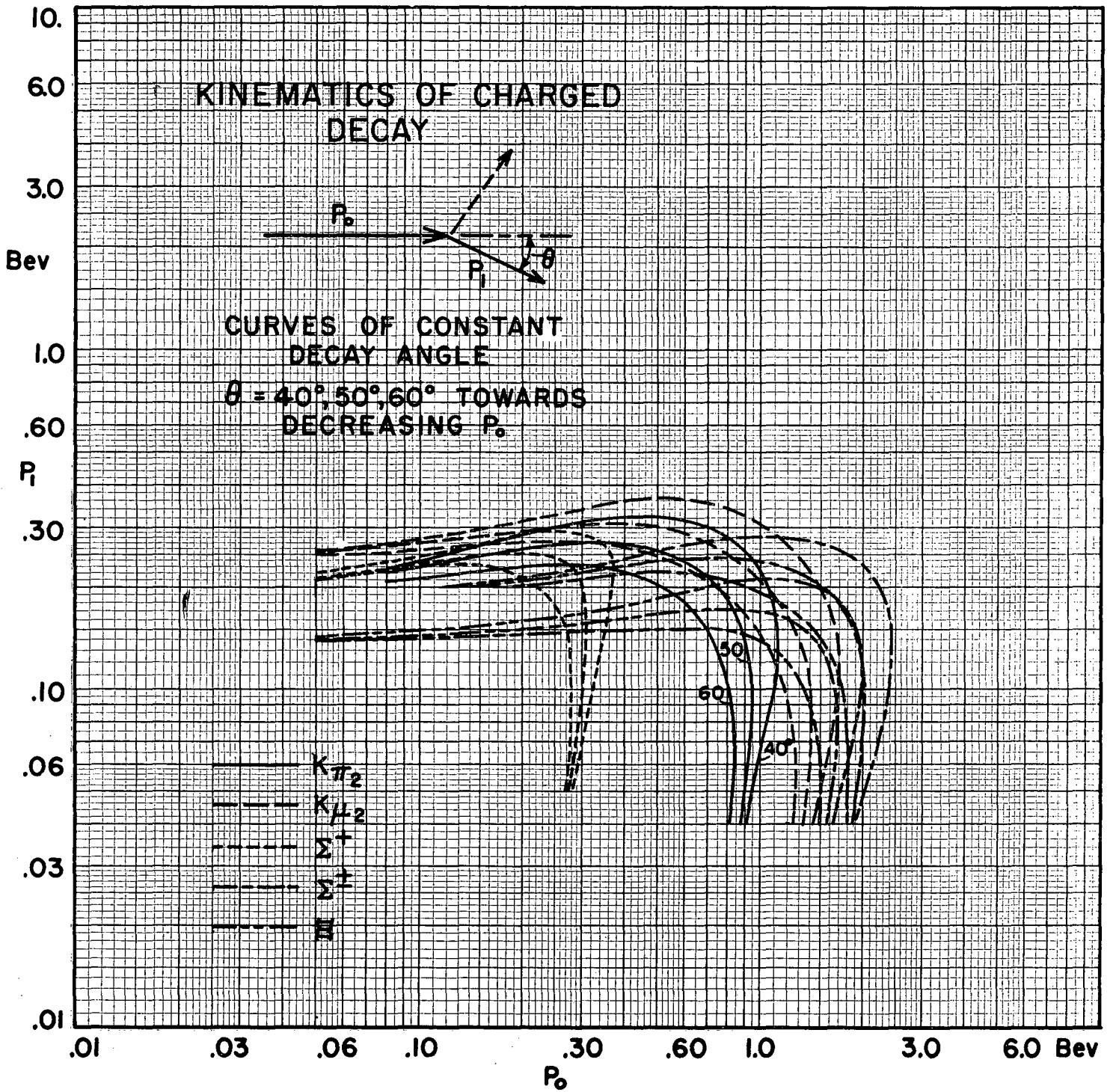
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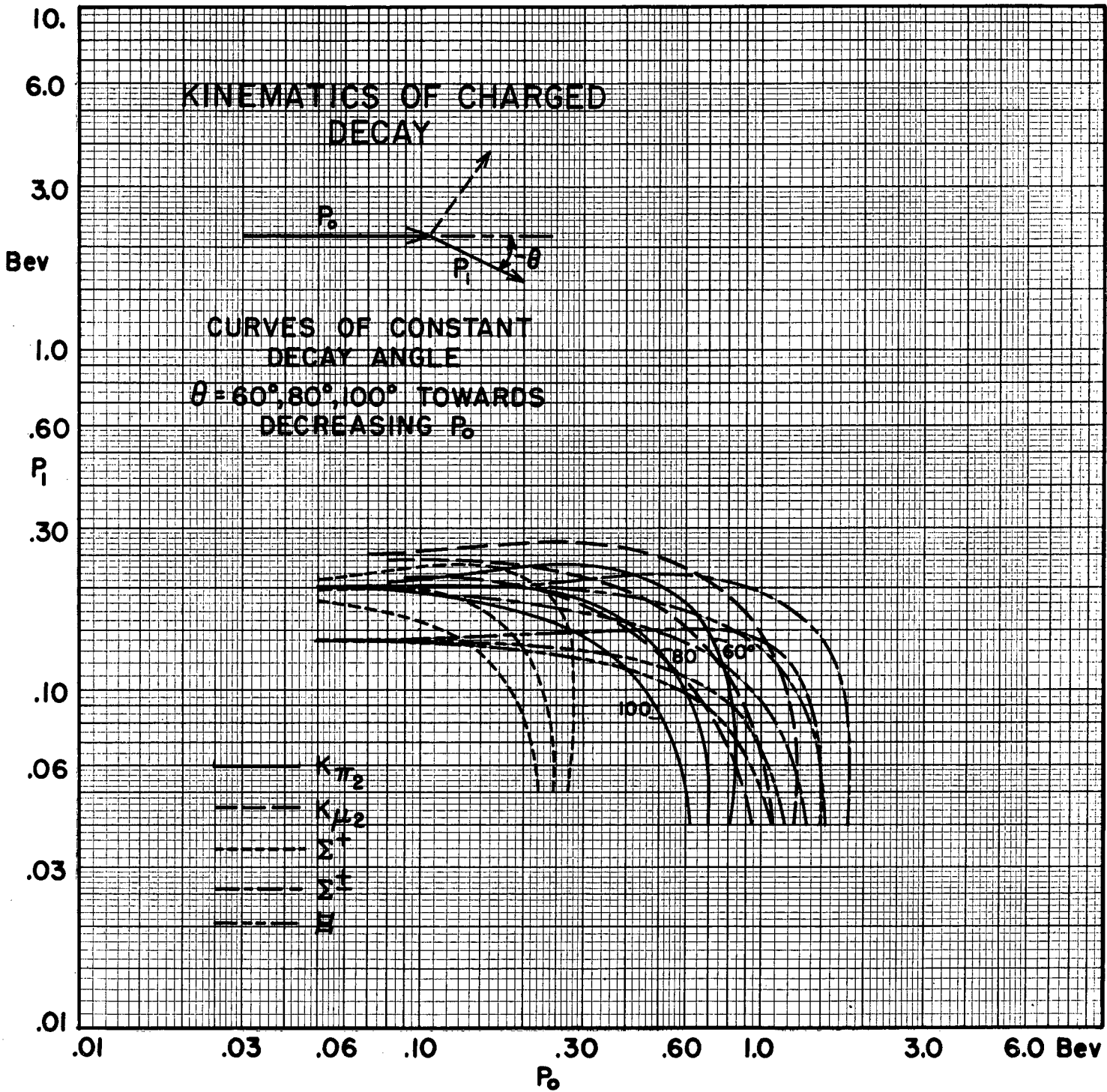


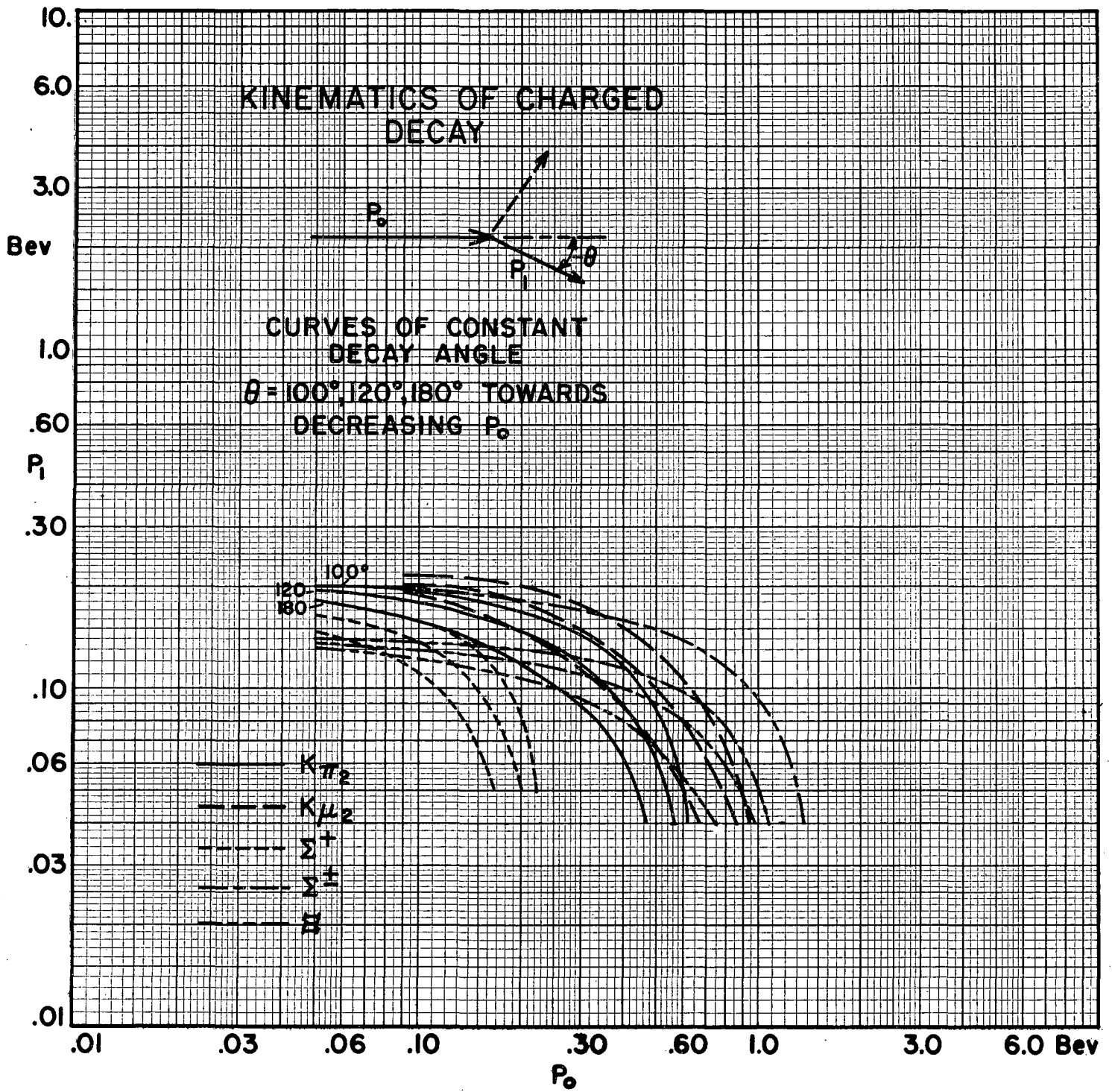












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