TRANSVERSE MOMENTUM DISTRIBUTION OF π° IN THE FRAGMENTATION REGION OF SUPER HIGH ENERGY INTERACTIONS

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The lateral distribution of γ-familige observed by emulsion chamber is sensitive to test transverse momentum of high energy interaction. But most part γ-families are succesive interation's resuts. so it is necessary to analyse the propagation of γ-ray in atmosphere. A γ-ray with energy Er and transverse momentum Pt is producted at the altitude h above the observation level (Fig.1). After cascade, the total observation energy reduce to Eob, the $P_{tr} = \frac{REr}{h} = R\,E_{ob}\,(\frac{1}{h}\,\frac{Er}{Eob})$. The arerage valne $\langle h\,\frac{E_{ob}}{E_r}\rangle$ has been calculated by Monte-Carlo simulation, Fig 2 give the relation between $\langle h\,\frac{Eob}{Er}\rangle$ and h. From h=1.5km to 30km and difference Er, the $\langle h\,\frac{E_{ob}}{Er}\rangle$ approximately is a constant, $\langle h\,\frac{Eob}{Er}\rangle \sim 1.7$km. From here, the transeverse momentum of π°

$$Pt\pi^{\circ} \simeq 2Pt\gamma \simeq 2R\ Eob/1.7km. \quad \langle 1 \rangle$$

In the cmulsion chamber experiment, Eob can be estimated by decascade method. There are 30 γ-familes observed by Ganbala emulsion Chamber with total observation energy $\Sigma E\gamma \geq 100$Tev and lateral spread $\langle ER \rangle \geq 15$Tev·cm selected. The value $Xij = \sqrt{EiEj}\ Rij \leq 2.5$Tev·cm is used to decasecade. the value R is measmed from energy center, then the $P_{t\pi o}$ distribution have been estimated by use relation⟨1⟩, In order to test this method, a group of Monte-Carlo simulation γ-families are used to compare with experimental data by same treatment. Fig 3 shows both distributions are consistent and consistent with a result of another analysis 2 ,but they have some difference with the Pt distribution of the model--- $\frac{dn}{dP_t^2} \propto e^{-4.5 P_t}$. It means the relation<1>is a approximate average, but Fig 3 shows only few π^0 are with large Pt value, the mean value $\langle Pt \rangle = 0.46 \pm 0.3$ in the $E \gtrsim 10^{15}$ ev and $\eta > 2.5$ regeon.

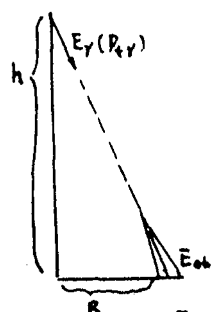

Fig. 1

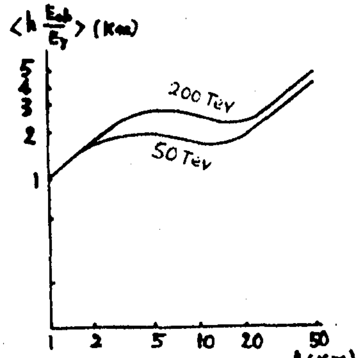

Fig. 2

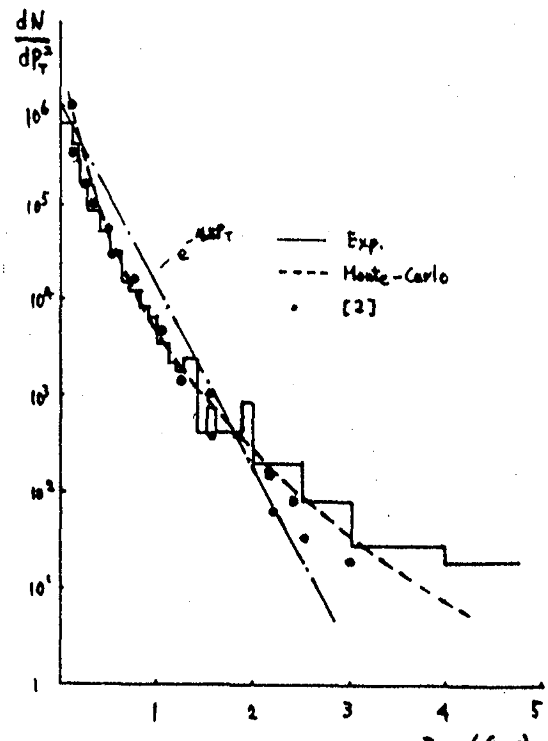

Fig. 3

Reference

[1] Jing et al., This volume

[2] Huo et al., Journal of Wuhan University, 1983, p.45