7. The average value of the transverse momentum for neutral π-mesons is 390 ± 25 Mev/c; the most probable value is 290 Mev/c, with an assymmetric spread $p_T=290^{+160}_{-90}$ Mev/c.

8. The ratio of $\pi^0 s$ to charged shower particles amongst the created particles is 0.4 ± 0.04, the same as determined at energies of $\approx$1000 Gev in nuclear emlsions, indicating that the fraction of $X^{\pm}$ particles (*i.e.* nonpions) amongst the created particles does not change significantly from an energy of 20 Gev to 1000 Gev, and is

$$\frac{N_{X^{\pm}}}{N_{X^{\pm}}+N_{\pi^{\pm}}}=0.2\pm.08$$

9. The interaction mean free path in brass for charged secondary particles is 133 ± 14 gms/cm^2.

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III-6-6. Investigation of a Dependence of the Average Fraction of Energy Imparted to the Neutral Pions on the Primary Energy*,**

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The aim of this work was to investigate a dependence of the average value of the coefficient of inelasticity on the primary energy (within the interval $E_0=10^{11}\sim10^{12}$ ev) by means of the Cerenkov counters system.

For evaluating of the primary energy "Calorimetrical method" was employed, which has been suggested by N. L. Grigorov. But the arrangement here used, is in distinction from the well-known types of the "ionization calorimeter", including seven Cerenkov counters that allowed to measure the number of relativistic particles under different layers of an absorber.

The experiments were conducted by the authors at the high-mountain scientific station of the Physics Institute of the Academy of Sciences of the Uzbek SSR (the Coom-Bel Pass, altitude of 3200 m above sea level).

During 850 hours of running of the arrangement, 550 showers were registered which have been created in the carbon block (with a thickness that corresponded to 20 g/cm^2) by single particles with $E_0>50$ Gev.

With the Cerenkov counter placed under the graphite block the multiplicity of the secondary particles n_s was measured.

The energy transfered to π^0-mesons in the first act of an interaction $E_{\pi 0}$ was estimated by measuring of the number of relativistic particles in the eletron-photon cascade shower under 3 cm thick layer of lead. The coefficient of inelasticity $K_{\pi 0}$ was defined as ratio of $E_{\pi 0}$ to E_0:

$$K_{\pi 0}=\frac{E_{\pi 0}}{E_0}\ .$$

All selected events were split up into the groups with energies corresponding different intervals; for each one of these intervals the values of the primary energy and the coefficient of inelasticity were averaged. For all energetic intervals the differential distributions of the magnitude of $K_{\pi 0}$ were also obtained.

An analysis of all these experimental results leads to the following conclusions:

1. The fraction of the primary energy transfered to the secondary π-mesons in

* This paper was read by N. A. Dobrotin.

** No manuscript has been received and the preprint is reprinted.

nucleon-nucleon interactions with energies 70~700 Gev is not a very large (smaller than 50%).

2. The coefficient of inelasticity $K_{\pi 0}$ depends on the primary energy slightly.

3. Multiplicity of the secondaries increases with the increasing of the primary energy slowly.

Discussion

Ezawa, H.: Are there also two peaks of inelasticity just as the case reported by Dr. Murzin?

Dobrotin, N. A.: I have no figure now and can tell nothing about individual cases, but the conclusion is that inelasticity is smaller than 50% in general at 10^{11}~10^{12} ev.

Menon, M. G. K.: The thickness of Cerenkov radiators is small compared to the area. The particles travel through the thickness in a vertical direction and the Cerenkov radiation is emitted at a small angle to their direction. If one takes the light out at the side then a very large number of reflections are needed before this occurs. This must result in inefficiency and further the light collected will depend on the position in the Cerenkov radiator through which the particles passed.

Dobrotin: It was checked by single μ-mesons and they found no change of the efficiency.

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III-6-7. The Composition of the Flux of the Cosmic Ray Nuclear-Active Particles of Momenta Higher than 1.8 Bev/c at the Altitude of 3250 m above Sea Level*

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The nature and the momentum spectra of the nuclear-active particles of cosmic radiation are investigated by means of magnet massspectrometer and five-layer gas proportional counters at the altitude of 3250 m above sea level. The results of the measurement of momenta and the ionization of the particles are given for the inferval of momenta 0,1-20 Bev/c.

In the flux of the nuclear-active particles of the cosmic radiation in the air is found that: the ratio $N_{\pi^+}/N_{\pi^-} = 0{,}90 \pm 0{,}15$ in the interval of momenta 100-720 Mev/c; π-mesons are ~5% of all the particles in the interval of momenta 0,1-22 Bev/c and not more than 10% of the particles of momenta $\geq 1{,}8$ Bev/c.

In the works related to the investigation of the nature and the spectra of the particles produced by cosmic rays, strictly speaking, the nature and the energy of the "primary" particles in most cases remain unknown.

The use of the cosmic rays for the investigation of the particle interaction processes in an energy region higher than the one given by the accelerator requires the knowledge of

* This paper was read by T. L. Asatiani.