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PROPERTIES OF MIXED SHOWERS

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ABSTRACT

Measurements with counter arrangements were made in Perú (4500 mt altitude) and in São Paulo (700 mt altitude). The main problems investigated were:

- a) The density spectrum of extensive penetrating showers.
- b) The percentage of penetrating particles present in the showers, in several density regions.
- c) Altitude effect.
- d) The variation of the density with the distance from the master arrangement.

The master arrangement consisted of 4 trays of counters located along the sides of a square and shielded by 20 cm of lead. The length of the side of the square was of 1.5 mt.

Fourfold coincidences among these trays were the master counting rate. Fivefold coincidences between the master arrangement and 2 additional trays, one unshielded and the other shielded by 20 cm Pb, located in the center of the square, were also registered. Similar measurements were also made with two additional trays located 3 meters away from the center of the square.

Varying simultaneously the area of the trays of the master arrangement, we verified that the density spectrum of extensive penetrating showers can be well represented, in the density region investigated, by a power law. The exponents found in Perú and in São Paulo were respectively 1.46 ± 0.02 and 1.52 ± 0.12

Our measurements in different density regions did not show any appreciable variation in the percentage of penetrating particles. The average values of this percentage in Perú and in

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São Paulo were respectively $(3.3 \pm 0.2) \%$ and $(5.9 \pm 1.1) \%$.

The master counting rate was 27.7 ± 2.28 times larger at 4500 mt than at 700 mt. This gives an apparent mean range of 104.2 ± 2.6 g/cm².

For the ratio of the density of penetrating particles in the center of the square to the density ~~to the density~~ 3 mt away from this center we found in Perú 0.53 ± 0.05 . For all particles this ratio is 0.47 ± 0.04