

On fluctuations of the charge particles multiplicities in the electromagnetic showers.

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Abstract.

Different types of gamma and electron detectors based on registration of the electromagnetic (EM) cascades are widely used in the modern HEP experiments. Thus the properties of EM showers are of particular interest. In this report the new results on the fluctuations of charge particles fluxes in the EM cascades initiated by 10 to 1000 GeV electrons in lead are presented. GEANT4 was used to calculate showers development in these studies. It is shown for the first time that asymmetric distributions of charge particle multiplicities are well described by the inverse sum of two exponents with 3 free parameters in a wide range of the Pb thickness where the average particle flux $\gg 1$. Two of these parameters define the steepness of the distribution slopes and the third one is close to the most probable value. The dependence of the distribution shapes on the shower depth is discussed in details. Presented data allow one to calculate the multiplicity distribution for any Pb depth and shower energy within the studied intervals.

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