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A relation between track length and deposited energy in homogeneous calorimeter by GEANT4 simulation at high energy

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We have simulated the track length and the total energy deposited by high energy particles, and found a very good correlation between these two observables in large homogeneous calorimeter. A straight-line fit does not pass through the origin, but the intercept of energy deposited is proportional to the incident energy. Moreover, for both electrons and hadrons the slope of the straight line is independent of the incident energy. The energy resolution of the calorimeter can be expressed in term of the distribution around the correlation, which we find to be very good, about $25\%\sqrt{E}$(GeV). We have extracted these results from GEANT4 simulations.

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