COMPARATIVE STUDY FOR NUCLEUS -NUCLEUS INTERACTIONS

AND MODIFIED CASCADE EVAPORATION MODEL AT (4.1-4.5)A GeV/c

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The characteristics of the nucleus–nucleus collisions at high-energy for the interactions of ^{1}H, ^{4}He, ^{12}C, ^{16}O, ^{22}Ne, ^{28}Si and ^{32}S with emulsion at a momentum of (4.1-4.5)A GeV/c have been investigated. It has been found that the multiplicity distributions of the different emitted particles and their average values can be described by the modified cascade evaporation model. The model reproduces satisfactorily the multiplicity distributions of the shower, grey and black particles and the correlations between the multiplicities of these particles. It has been seen that the number of the produced shower particles increases with the increase of the projectile mass number. From the correlation between the average multiplicity of the evaporation particles and the number of the produced particles, it was found that a phase transition in the target system may occur. The calculated pseudo–rapidity distributions of the produced shower particles are typically Gaussian shaped in the mid-rapidity region and agree well with the experimental data. Also, the angular distributions of the grey and black particles have been investigated. The angular distributions of the grey particles show a universal shape independent of the type of projectile. The angular distributions of the black particles are nearly isotropic with a small asymmetry in the forward direction. The modified cascade evaporation model reproduces the general characteristics of the nucleus–nucleus interactions and gives an explanation for the multiparticle production process.