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Experimental Determination of the Ion-Ion Potential and Nuclear Densities for the $^{12}\text{C}, ^{16}\text{O} + ^{208}\text{Pb}$ Systems

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We have determined the ion-ion potentials for the $^{12}\text{C}, ^{16}\text{O} + ^{208}\text{Pb}$ systems by measuring elastic scattering cross sections at energies below the reaction barrier. Due to the small number of reaction channels with relevant cross sections at this energy range, the coupled channels data analysis is reliable and the ion-ion potentials can be extracted from data analysis (for details see Ref. [1,2,3]). We have also compared the data extracted potentials with those from double-folding calculations including the effects of exchange nonlocality [4,5,6].

The nuclear matter density of the projectiles in the surface region has been determined. The "experimental" densities are compared to theoretical calculations.

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Hyperon production in pion nucleus reaction at 2 GeV

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Recently, we have applied Monte Carlo calculations based in a intranuclear cascade model (PRC 55, 2625 (1997), Goncalves et al.) to the analysis of relativistic heavy ion collisions. Our calculations are in quite good agreement with the experimental results for energy spectra of protons and pions, and pions multiplicity. Also, we have explored the effect of multiparticles collision. In the present work, making use of the same calculation method, we analyze the pion-nucleus collision at 2 GeV to study the production of hyperons and the probability of hypernucleus formation.