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Surface coalescence model for proton-nucleus high energy collisions

The cluster formation is not a fully understanding process until today, several theoretical models are emerging with the intention of explaining the phenomenon and reproducing the experimental data. The main objective of this work is to conceive a new method based on first physical principles independent on experimental parameters. Taking as scenario of this work the nuclear reactions p-197Au and p-208Pb moderated by intranuclear cascades model, a theoretical model is proposed to describe fragments productions (for example deuteron, triton, 3He, 4He and other light ions) at the fast stage of the nuclear reactions at high energies. In particular, the process of coalescence is considered on the surface of the target nucleus. The potential of Wood-Saxon is used to establish the criteria of neighborhood corresponding to the distance and the relative moments between nucleons. For the probabilities and the cross sections calculations we work in the quantum mechanical phase space of the Wigner distribution.

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