AN ACCURATE ELABORATION OF GLAUBER'S OPTICAL MODEL FOR TREATMENT OF NUCLEUS-NUCLEUS COLLISIONS

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Up to now a number of models treating nucleus - nucleus collisions have been developed. Many of them have had Glauber's model as their basic structure. The whole set of presently available models can be devided in two groups, according to the role they give to the function of nuclear mass density $\rho_N(\vec{r})$.The first group treats the function $\rho_N(\vec{r})$ with an inaccurate flexibility in order to obtain the best possible predictions for the cross section for inelastic scattering og nucleus A on nucleus B, σ_{in}^{AB} and number of "wounded nucleons", ν_A . The price one pays in such modells is obvious: $\rho_N(\vec{r})$ is dependent on a number of adjustable parameters and the results it yields cannot be used to justify our choice of chape for $\rho_N(\vec{r})$. The second group of models treats $\rho_N(\vec{r})$ more accurately and the results for σ_{in}^{AB} and ν_A are sensitive to the shape of $\rho_N(\vec{r})$. But in these models predictions for σ_{in}^{AB} and ν_A are satisfactory only in a limited range of A and B. We took it as our task to produce a model that will have the virtues of both groups of models. In that sense it was sufficient to trace back Glauber's set of fundamental suppositions and make them explicit. After that it was obvious that Glauber had applied his set of postulates and initial equations to the very specific case of dimensionless projectile. Rejection of this superfluous specification had completed the physical model and the remaining task was to correspond it with an appropriate mathematical model. At the analitical stage mathematical model gave a rise to a new quantity, σ_{in}^{1B} , which is a cross section for inelastic scattering of a single nucleon originating from the projectile. σ_{in}^{1B} describes the integral geometrical character of the projectile from which particular nucleon is originating and this information about projectile nucleus is transmitted all the way to the final results for σ_{in}^{AB} and ν_A . The use of σ_{in}^{1B} improves the estimation of the total cross section σ_{in}^{AB} and ν_A number. Now we have the model that provides us with reliable tool for testing our probing functions for $\rho_N(\vec{r})$ and we are able to compute σ_{in}^{AB} and ν_A up to 8 % of their experimental value, as can be seen from the table below, calculated for reactions A + B $\rightarrow$ X + .., B = 181, and impulse of nucleons A is 4,2 GeV/c/N. 1)

	A=2		A=4		A=12	
	comp.	exper.	comp.	exper.	comp.	exper.
$\sigma_{in}^{1B}(b)$	1.730		1.784		1.998	
ν_A	1.658	1.60±0.04	2.790	2.80±0.10	6.575	6.60±0.30
D_ν^2	0.225	0.24±0.02	1.466	1.64±0.09	16.995	16.80±1.00
$\sigma_{in}^{AB}(b)$	2.088	1.94±0.11	2.557	2.34±0.12	3.647	3.67±0.22

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