Inelastic Scattering of Protons on ^{9}Be Nucleus $(\mathbf{J}^\pi = \mathbf{3/2}^+)$ in the Framework of Glauber Theory

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In the framework of Glauber diffraction theory a calculation of differential cross section for inelastic p^{9}Be-scattering has been carried out. The wave function of ^{9}Be nucleus for the ground and the excited states in the three-particle $\alpha + \alpha + n$ – model was used. The expansion of the ^{9}Be wave function in gaussoids series and representation of the Glauber Ω operator in a form conjugating to the three-particle wave function allow calculating analytically the matrix elements of the inelastic scattering with account of all orders of scattering and re-scattering on clusters and a nucleon of the ^{9}Be nucleus.

In Figure there is a cross section of inelastic p^{9}Be-scattering $(J^\pi = 3/2^+)$ with different model functions of the ^{9}Be nucleus at $E_p = 180$ MeV. Curves 1 and 2 – are the calculation with the wave function in models 1 and 2, curve 3 – with oscillatory wave function, curve 4 and experiment are from [1].

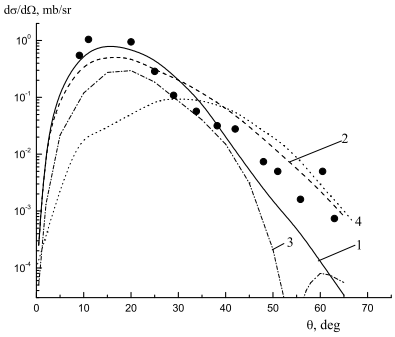

Figure 1: The differential cross-section of p^{9}Be-scattering at level $J^\pi = 3/2^+$. Experimental data are from [1]. Explanation is provided in the text.

The cross section with the three-particle wave function in the model 1 is closer to experiment in the forward angles range. The calculation at large angles is beyond the accuracy of the Glauber theory. For comparison we showed the result of calculation in the distorted waves approximation [1].

References

[1] S. Dixit, W. Bertozzi, T.N. Buti, et al. *Phys. Rev. C.* **43** (1991) 1758.