Elastic and inelastic longitudinal electron scattering from ⁹Be in the first excited state

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The $1/2^+$ first excited state of ^{9}Be, which lies at energy of 1.68 MeV and only about 20 keV above the neutron-emission threshold, is of especial interest. It is found that this state can be considered as a halo (the root mean-square radius is $<R^*>=(3.42\pm0.2)$ fm) [1].

Electron scattering is one of the most effective methods of studying the properties of the energy levels of atomic nuclei [2]; so it is extremely productive and powerful tool to research nuclear structure.

Elastic and inelastic longitudinal electron scattering has been researched in the framework of three-particle (2α+n)-model with the αα Ali-Bodmer potential [3]. Our calculations show that ^{9}Be in the first excited state has a halo-structure (the rms charge radius is about $<R_{ch}>=2.84$ fm).

In this paper we calculated the transitions to the $J^\pi=1/2^+$, $3/2^+$ states of ^{9}Be. According to the results, the probability of the transition to the $(3/2^+, 1/2)$ state is extremely low.

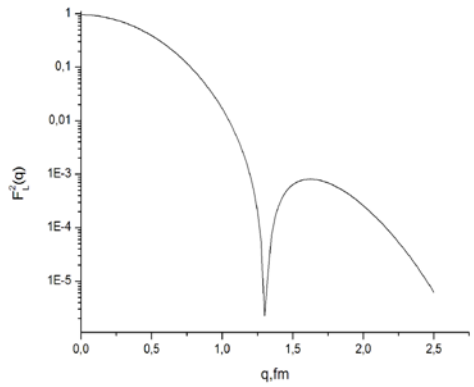

Figure 1. Elastic Coulomb form factor for the transition to the $(1/2^+, 1/2)$ state in ^{9}Be

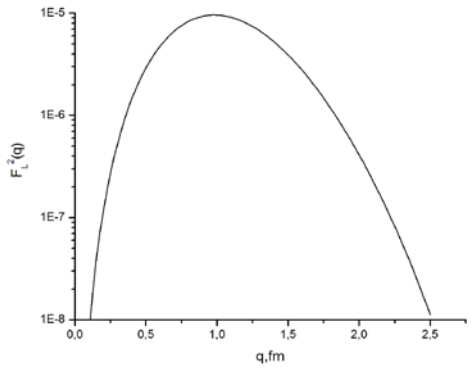

Figure 2. Inelastic Coulomb form factor for the transition to the $(3/2^+, 1/2)$ state in ^{9}Be

References

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