

Coupled-channels analyses for $^{9,11}\text{Li} + ^{208}\text{Pb}$ fusion reactions with multi-neutron transfer couplings

Wednesday, 6 June 2018 10:45 (18)

We discuss the role of two-neutron transfer processes in the fusion reaction of the $^{9,11}\text{Li} + ^{208}\text{Pb}$ systems. We first analyze the $^9\text{Li} + ^{208}\text{Pb}$ reaction by taking into account the coupling to the $^7\text{Li} + ^{210}\text{Pb}$ channel. To this end, we assume that two neutrons are directly transferred to a single effective channel in ^{210}Pb and solve the coupled-channels equations with $\text{\textcolor{rgb}{0.98,0.00,0.00}}{the}$ two channels. By adjusting the coupling strength and the effective Q -value, we successfully reproduce the experimental fusion cross sections for this system. We then analyze the $^{11}\text{Li} + ^{208}\text{Pb}$ reaction in a similar manner, that is, by taking into account three effective channels with $^{11}\text{Li} + ^{208}\text{Pb}$, $^9\text{Li} + ^{210}\text{Pb}$, and $^7\text{Li} + ^{212}\text{Pb}$ partitions. In order to take into account the halo structure of the ^{11}Li nucleus, we construct the potential between ^{11}Li and ^{208}Pb with a double folding procedure, while we employ a Wood-Saxon type potential with the global Aky^{uz}-Winther parameters for the other channels. Our calculation indicates that the multiple two-neutron transfer process plays a crucial role in the $^{11}\text{Li} + ^{208}\text{Pb}$ fusion reaction at energies around the Coulomb barrier.

Summary

Primary author(s) : Dr KI-SEOK, Choi (Department of physics, Soongsil Univ.)

Co-author(s) : Prof. MYUNG-KI, Cheoun (Department of physics, Soongsil Univ.); Prof. K.S., Kim (Korea Aerospace University); Dr HAGINO, Kouichi (Department of Physics, Tohoku University); Prof. W.Y., So (Kangwon National University)

Presenter(s) : Dr KI-SEOK, Choi (Department of physics, Soongsil Univ.)

Session Classification : Session 10