

2018-19

3.3.3 (4)

Modern Physics Letters A  
 Vol. 34 (2019) 1950087 (9 pages)  
 © World Scientific Publishing Company  
 DOI: 10.1142/S0217732319500871

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# Analysis of fusion excitation functions of reactions ${}^6\text{He} + {}^{209}\text{Bi}$ and ${}^7\text{Li} + {}^{209}\text{Bi}$ around Coulomb barrier

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Received 25 July 2018

Revised 6 December 2018

Accepted 8 January 2019

Published 19 March 2019

Here, we have studied the sensitivity of fusion excitation functions of reactions induced by weakly bound projectiles  ${}^6\text{He}$  and  ${}^7\text{Li}$  on  ${}^{209}\text{Bi}$  target on nuclear potential parameters and on number of partial waves. The Kemple version of WKB approximation and Hill-Wheeler formula has been used to predict the fusion transmission probability below and above the Coulomb barrier, respectively, and the optimum values for radius ( $r_0$ ) = 1.17 fm, diffuseness ( $a$ ) = 0.5 fm and for partial waves ( $l$ ) = up to 60 are proposed. The coupled channel calculations have also been performed and it is found that the matching between data and predictions have been enhanced on inclusion of coupling effects. Further, the breakup effects are also taken into account through the dynamic polarization potential (DPP) approach. It further improves matching between data and predictions.

**Keywords:** Weakly bound nuclei; interaction potential; fusion reaction cross-section.

PACS Nos.: 25.60.-t, 25.70.-z

The availability of RIB facilities created a renewed interest in nuclear reaction induced by nuclei lying in the close proximity of drip lines.<sup>1-8</sup> The earlier studies on breakup reactions have confirmed the existence of novel halo and Borromean structure among some of the highly neutron rich and proton rich isotopes.<sup>8-11</sup> Owing to diffused density and low breakup threshold, the fusion reactions involving

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