

## Direct and fusion reactions including weakly-bound and halo nuclei

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I discuss direct and fusion reactions including weakly-bound and halo nuclei. At first, to this end, I introduce the expended optical potential for direct reaction calculations as elastic scattering, inelastic, and breakup from strand optical model formalism, and emphasize the benefit of extended optical model. Then, I review previous results of direct reactions which include neutron halo systems as  $^{11}\text{Li} + ^{208}\text{Pb}$ ,  $^{11}\text{Be} + ^{64}\text{Zn}$ ,  $^{11}\text{Be} + ^{120}\text{Sn}$ ,  $^{11}\text{Be} + ^{197}\text{Au}$  and proton halo systems as  $^{17}\text{F} + ^{208}\text{Pb}$ . In addition, I also take into account fusion reactions including exotic nuclei in barrier penetration model (BPM) manner. For this calculation, coupled channel approach are employed with folding potential that is considered separation of core and valance part. Finally, I show our results of fusion reactions as  $^{11}\text{Li} + ^{208}\text{Pb}$  and  $^{15}\text{C} + ^{232}\text{Th}$  and look at the contribution of several effects as deformation, valance-neutron and transfer effects.

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