

Fusion cross section in ${}^4,6\text{He}+{}^{64}\text{Zn}$ collision around and below the Coulomb barrier

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A lot of experimental (see e.g. [1,2] and ref therein) and theoretical work (see e.g. [3-4]) has been performed, in recent years, in order to understand the effect of the projectile structure and reaction dynamics on the fusion mechanisms in collisions induced by light halo and/or weakly bound nuclei. It is expected that the properties of the halo nuclei would play a role in the fusion mechanism at energies around and below the Coulomb barrier. New results concerning the measurement of fusion cross section of ${}^4,6\text{He}+{}^{64}\text{Zn}$ collision will be presented. The ${}^6\text{He}$ nucleus is a halo nuclei and is known to have an extended two neutron distribution. The study of the reaction induced by the stable well bound isotope, ${}^4\text{He}$, allows to understand the role of the two neutrons halo in the ${}^6\text{He}$. A new measurement at energy below the Coulomb barrier with the ${}^4\text{He}$ beam was performed in order to extend to lower energies the fusion excitation function in order to cover the same energy region of ${}^6\text{He}$ data [5]. The fusion cross section was measured by using an activation technique where the radioactive evaporation residues produced in the reaction were identified by the X-ray emission which follows their electron capture decay. By comparing the two systems, we observe an enhancement on the fusion cross section in the reaction induced by ${}^6\text{He}$, at energy below the Coulomb barrier.

[1] Canto et al., *Phys.Rep.* (2006) 424, 1

[2] Dasgupta, Hinde *Ann.Rev. Nucl. Part. Sci* (1998) 48, 401

[3] Takigawa et al., *Phys.Lett. B* (1991) 265, 23

[4] Ito et al., *Phys.Lett. B* (2006) 637, 53

[5] Di Pietro et al. *Phys.Rev. C* 69 (2004) 044613