



Contribution ID: 109

Type: Oral

Reactions with Exotic Nuclei at Near- and Sub-barrier Energies

Thursday, 16 May 2019 15:50 (20 minutes)

Reaction with Exotic Nuclei at Near- and Sub-barrier Energies become a hot topic of current interest in nuclear physics. In the talk, I would like to present recent results obtained in the nuclear reaction group of CIAE.

The first topic is on the optical model potentials (OMPs) of exotic nuclear systems. Due to the limitations of intensity and quality of RIBs, it is difficult to extract the OMPs of exotic nuclear systems by the elastic scattering. For this reason, a transfer reaction method was proposed and applied to extract the OMPs of $6\text{He}+^{12}\text{C}$, 64Zn , ^{209}Bi systems via ^{11}B , ^{63}Cu , $^{208}\text{Pb}(^7\text{Li},^6\text{He})$ reactions [1]. The threshold anomaly behavior has been obtained in the $6\text{He}+^{209}\text{Bi}$ system for the first time [2]. Results show that the dispersion relation is not applicable for the exotic nuclear systems. Possible reasons are discussed but further study is strongly required to discover the underlying physics.

The second topic is on the reaction mechanism of exotic nuclear systems. An important task is to understand the breakup effects as well as its mechanism. To this end, a complete-kinematics measurement method was developed and applied in the $^{17}\text{F}+^{58}\text{Ni}$, ^{89}Y [3], ^{208}Pb and $^7\text{Be}+^{208}\text{Pb}$ experiments. The processes of elastic scattering, breakup/transfer, and fusion evaporation have been identified successfully. Preliminary results of $^{17}\text{F}+^{58}\text{Ni}$ show that elastic breakups are dominant, moreover, the fusions are suppressed above the barrier while enhanced below the barrier.

[1] L. Yang, C. J. Lin, H. M. Jia et al., Phys. Rev. C 96, 044615 (2017); Phys. Rev. C 95, 034616 (2017); Phys. Rev. C 89, 044615 (2014); Phys. Rev. C 87, 047601 (2013).

[2] L. Yang, C. J. Lin, H. M. Jia et al, Phys. Rev. Lett. 119, 042503 (2017).

[3] G. L. Zhang, G. X. Zhang, C. J. Lin et al., Phys. Rev. C 97, 044618 (2018).

Primary author: Prof. LIN, Chengjian (China Institute of Atomic Energy)

Presenter: Prof. LIN, Chengjian (China Institute of Atomic Energy)

Session Classification: Session XXI (Parallel Session)