New data, puzzles, open questions in the interaction at the barrier of ^{9,10,11}Be, ^{6}Li with ^{208}Pb, ^{209}Bi

C.Signorini
Physics Department of the University and INFN, via Marzolo 8, 35131 Padova, Italy.
signorini@pd.infn.it

In the present talk we want to discuss about recent data on the interaction at the Coulomb Barrier induced by nuclei such as: halo(^{11}Be), loosely bound (^{9}Be,^{6}Li), "standard radioactive" (^{10}Be).

The fusion process is expected/predicted to be influenced by the halo/low binding energy. This happens in some cases like ^{6}He+^{258}U; but our recent data (RIKEN) on subbarrier fusion in the systems ^{9,10,11}Be+^{209}Bi give evidences, within a limited statistics, of very similar behavior of all ese three nuclei! The reason of this is not so clear since theory predicts different behaviour especially in the case of ^{11,10}Be: the first one halo/loosely bound nucleus, the second one well bound. The role of the expected breakup for ^{11}Be is not so clear as well as it dynamics. From the data collected (LNL) in a "similar system" ^{6}Li+^{208}Pb we observe: projectile breakup in two components alpha+deuteron but also, with comparable strength, partial fusion/stripping breakup of either fragments. This is not well under control by theory.

Finally the ^{9}Be+^{209}Bi fusion behaves apparently in a different way from 9Be+208Pb since the same type of CCFULL calculations reproduce in the first case the data while in the second case a 30% reduction of theoretical cross section has to be extra added.

In summary much experimental and theoretical work has ben done in the field with halo, loosely bound nuclei with lot of understanding but puzzles still remain: they originate partly from the low statistics, due to radioactive beams, and partly to the limitations in the theoretical tools accessible in an "easy " way.