# Do halos exist on the dripline of deformed nuclei?

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During the early years of RNB physics, as the dripline for light nuclei was being explored, nuclear halos were a very hot topic. and new halos were discovered one after the other. In the last few years a reduced number have been added to the list and, as one moves toward heavier systems, the big open question is whether the halo phenomenon can develop and whether it can help in the fusion of superheavy elements. Another aspect that brings halos back to stage, is that is appear not only in nuclear physics but also atomic, molecular or condensed matter physics [1].

In order to successfully describe a halo nucleus, the structure model needs to take into account: i) the very low density region in which the halo nucleons move, subject to an interaction that is closer to the free NN interaction than the realistic in-medium nuclear interaction; ii) the long tails of the wavefunctions and correct asymptotics of these tails, which contribute decisively to many nuclear properties; iii) the few body dynamics of the few valence nucleons relative to the core and between themselves. For these reasons, it is acceptable to decoupled the halo degrees of freedom from the core's, simplifying the standard microscopic treatment: this is the basis for applying few-body models to halo-like systems.

We explore the evolution of the structure of the ground state of a nucleus with two valence nucleons as the system approaches the two particle threshold [2]. We use a three-body model of $core + n + n$ where the core is deformed and allowed to excite. Starting with $^{12}$Be system which has been thoroughly described with this model, we find that both NN correlations and correlations due to deformation/excitation of the core inhibit the formation of halos. Our results suggest that it is unlikely to find halo nuclei on the dripline of deformed nuclei. However, we find that the halo hindrance is not as strong for heavier masses. In this talk we present our results and compare with previous work performed within mean field models [3,4,5,6,7,8].

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