Structure Beyond the Neutron Dripline Using Intermediate-Energy Knockout and Breakup

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The light nuclei provide a fertile testing ground for our understanding of nuclear structure. From an experimental point of view, this is the only region for which nuclei lying at and beyond the neutron dripline may be accessed at present. Theoretically a range of models, including various shell model approaches and ab initio type models, are now capable of furnishing realistic predictions. In addition, the structure of unbound systems, such as ^{10}Li and ^{13}Be, are key to constructing three-body descriptions of two-neutron halo and related nuclei.

One of the tools particularly well adapted to probing the structure of nuclei far from stability is that of "knockout" or few-nucleon breakup of a high-energy radioactive beam. In the present contribution, the application of the technique to intermediate-energy beams to probe the low-lying level structures of ^{9}He, ^{10}Li and ^{13}Be will be described.

As will be seen, the evidence acquired indicates that the well-known ^{11}Be ground-state parity inversion also occurs in the more exotic N=7 isotones ^{10}Li and ^{9}He. In the case of N=9, the $\nu s_{1/2} - \nu d_{5/2}$ ground-state inversion observed in neighbouring isotones ^{15}C and ^{14}B appears to persists in ^{13}Be.