Light exotic systems at relativistic Velocities

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Light nuclei far from stability [1] provide a fertile testing ground for nuclear structure models and the underlying forces. A series of experiments has been performed in order to study extremely neutron rich nuclei at and beyond the driplines, where the neutron separation energy vanishes, by using breakup reactions. Beams with large neutron excess were produced in flight at several 100 MeV/nucleus and directed to a versatile reaction setup. The relativistic kinematics allows describing the reaction process cleanly and the internal motion of the valence nuclei is slow compared to the interaction time. Experimentally the forward focusing of the reaction products enables covering practically the full solid angle with high detection efficiency. As result of the dissociation typically 2 to 3 fragments interact in the exit channel of the reaction and form even more asymmetric nuclear systems like e.g. ^{5}H. They can be characterized by studying their kinematic correlations in the continuum. Selected findings in the outskirt of the nuclear landscape will be shown and discussed together with the underlying structure of the bound exotic projectiles leading to their formation.

[1] B. Jonson, Phys. Rep. **389**, 1 (2004).