Contribution ID: **130** Type: **Oral**

Reaction spectroscopy of Borromean nuclei at the drip-lines shed light on the nuclear force and shell evolution

Wednesday, 15 May 2019 10:00 (20 minutes)

Borromean nuclei are unique bound quantum systems with unbound sub-systems, that tend to appear in neutron-proton asymmetric isotopes at the edges of the nuclear landscape. Such weakly bound few-body systems can provide sensitive grounds for understanding the nuclear force through their structural properties and interaction. This presentation will describe different techniques of reaction spectroscopy measurements with re-accelerated beams at TRIUMF and in-flight beams at RIBF to explore the ground and excited states of these drip-line nuclei.

At the proton drip-line, spectroscopy of ^{20}Mg from inelastic scattering with a solid D_2 target at the IRIS facility at TRIUMF will be discussed. The observation of new states will be presented and compared to new *ab initio* theory predictions. The reaction spectroscopy also offers potential to investigate collectivity that will be discussed to understand shell evolution. The presentation will show how a strong sensitivity to the nuclear force emerges from proton elastic scattering of ^{10}C.

In the neutron-rich domain, defining the low-Z end of the island of inversion around $N = 20$ remains as an open problem. The presentation will discuss exploration of the ground state features of the drip-line nucleus ^{29}F using intermediate energy in-flight beams at RIBF.

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Session Classification: Session XIII