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Investigation of ^{10}Li resonance component in ^{11}Li via the ^{11}Li(p,d) reaction

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The unbound system ^{10}Li is of great interest for the description of the structure of the Borromean neutron halo nucleus ^{11}Li [1,2]. Borromean neutron halo nuclei are unusual weakly bound states of a core nucleus plus two neutrons. No transfer reaction experiment has been done so far which directly looks at the sub-component ^{10}Li within ^{11}Li. While earlier measurements have indicated possible resonances in ^{10}Li [3-6], it is still not well established which resonance contributes to the ground state configuration of ^{11}Li and by what spectroscopic factor. To obtain such information a decisive way can be investigating the transfer of one-neutron from ^{11}Li.
The presentation will report observations on ^{10}Li studied through the first measurement of the p(^{11}Li,d) one-neutron transfer reaction at beam energy of 6A MeV. This was performed using a solid H2 target at the newly constructed IRIS facility at TRIUMF. The ^{10}Li residue was populated strongly as a resonance with energy Er = 0.62 ± 0.04 MeV having a total width Γ = 0.33 ± 0.07 MeV. The angular distribution of this resonance is characterized by neutron occupying the 1p1/2 orbital. A DWBA analysis yields a spectroscopic factor of 0.67 ± 0.12 for p1/2 removal strength from the ground state of ^{11}Li to the region of the peak.

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