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## Investigation of <sup>10</sup>Li resonance component in <sup>11</sup>Li via the <sup>11</sup>Li(p,d) reaction

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The unbound system <sup>10</sup>Li is of great interest for the description of the structure of the Borromean neutron halo nucleus <sup>11</sup>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 <sup>10</sup>Li within <sup>11</sup>Li. While earlier measurements have indicated possible resonances in <sup>10</sup>Li [3-6], it is still not well established which resonance contributes to the ground state configuration of <sup>11</sup>Li and by what spectroscopic factor. To obtain such information a decisive way can be investigating the transfer of one-neutron from <sup>11</sup>Li.

The presentation will report observations on <sup>10</sup>Li studied through the first measurement of the  $p(^{11}Li,d)$  oneneutron 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 <sup>10</sup>Li residue was populated strongly as a resonance with energy Er = 0.62 ± 0.04 MeV having a total width  $\Gamma$  = 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 <sup>11</sup>Li to the region of the peak.

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[1] E. Garrido, D.V. Fedorov, A.S. Jensen, Nucl. Phys. A 700 (2002) 117.

[2] I. Tanihata, H. Savajols, R. Kanungo, Prog. in Part. and Nucl. Phys. 68 (2013) 215.

- [3] H.B. Jeppesen, A.M. Moro, U.C. Bergmann, et al., Phys. Lett. B 642 (2006) 449.
- [4] K.H. Wilcox, R.B. Weisenmiller, G.J. Wozniak, et al., Phys. Lett. B 59 (1975) 142.
- [5] A.I. Amelin, M.G. Gornov, Yu.B. Gurov, et al., Yad. Fiz. 52 (1990) 1231.
- [6] M. Zinser, F. Humbert, T. Nilsson, et al., Nuclear Phys. A 619 (1997) 151176.

**Primary authors:** Dr SANETULLAEV, Alisher (Saint Mary's University, TRIUMF, Inha University in Tashkent); Prof. KANUNGO, Rituparna (Saint Mary's University)

**Co-authors:** Mr GALLANT, Aaron (TRIUMF); Prof. CHEN, Alan (McMaster University); Prof. SHOT-TER, Alan (University of Edinburgh); Dr ROJAS, Alexander (TRIUMF); Dr HADINIA, Baharak (University of Guelph); Dr DAVIDS, Barry (TRIUMF); Dr UNSWORTH, Carl (TRIUMF); Prof. ANDREOIU, Corina (Simon Fraser University); Dr MILLER, David (TRIUMF); Ms MCNEICE, E. (Saint Mary's University); Dr HACKMAN, Greg (TRIUMF); Prof. CHRISTIAN, Gregory (Texas AM University - Cyclotron Institute); Dr SAVAJOLS, Herve (GANIL); Dr THOMPSON, Ian (LLNL); Prof. TANIHATA, Isao (RCNP, Beihang University); Ms PURCELL, J. (Saint Mary's University); Mr RANDHAWA, Jaspreet (Saint Mary's University, Halifax); Dr FALLIS, Jennifer (TRI-UMF); Dr LIGHTHALL, Jonathan (TRIUMF); Mr FORTIN, Julien (Saint Mary's University, University of Laval); Mr TANAKA, Junki (Research Center for Nuclear Physics); Dr ALCORTA, Martin (TRIUMF); Mr KEEFE, Matthew (Saint Mary's University); Dr GALINSKY, Naomi (TRIUMF); Prof. GARRETT, Paul (University of Guelph); Dr BENDER, Peter (TRIUMF); Dr VOSS, Philip (TRIUMF); Dr KRUECKEN, Reiner (TRIUMF); Dr ISHIMOTO, Shigeru (KEK); Dr ROGER, Thomas (GANIL); Dr WANG, Zhimin (TRIUMF)

Presenter: Dr SANETULLAEV, Alisher (Saint Mary's University, TRIUMF, Inha University in Tashkent)

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