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Study of the A=9 T=3/2 isobaric quartet through R-Matrix analysis of resonance scattering of analogue states.

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Studies of the structure of neutron rich nuclei are important for exploring shell evolution and the development of theoretical models. While transfer reactions are currently the primary method of studying neutron rich nuclei it is suggested that study of isobaric analogue states through resonance proton scattering could be used as well [1]. We've performed a benchmark study of the A=9, T=3/2 isobaric quartet, populating T=3/2 states in 9Be using 8Li+p resonance scattering. R-matrix analysis combined with the optical model has been applied for analysis of the 8Li+p excitation function to extract the parameters of the isobaric analog states in 9Be. We compare the results of this experiment to the available data on 9Be T=3/2 states and on the other members of the A=9, T=3/2 isobaric quartet - 9Li [2] and 9C [3]. We show that proton resonance scattering can be a useful complimentary tool for spectroscopy studies of neutron rich nuclei with radioactive beams, provided that robust procedure can be established to fix the parameters of the optical model potentials. The radioactive beam of 8Li was delivered by RESOLUT facility at the John D. Fox superconducting linear accelerator facility at Florida State University and also by MARS facility at the Cyclotron Institute at Texas A&M University. The 8Li+p excitation function was measured using modified thick target approach and also with active target detector - Texas Active Target (TexAT), as part of TexAT's commissioning run.

[1] V. Z. Goldberg, AIP Conference Proceeding 455 319 (1998)
[2] A.H. Wuosmaa, et al., Phys. Rev. Lett. 94 082502 (2005)
[3] G. V. Rogachev et al., Phys. Rev. C 75 014603 (2007)

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