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The Structure of ^{9}C and ^{7}He.

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Light exotic nuclei provide important insights into the understanding of nuclear forces at large neutron to proton ratios, unreachable for heavier nuclei. The progress in development of modern theoretical approaches such as quantum Monte-Carlo calculations (QMC) and no-core shell model (NCSM) allows for predictions of properties of light nuclei (A¡12) from the basic principles, starting from bare nucleon-nucleon interaction. Unfortunately, experimental information on the structure of many light exotic isotopes is very incomplete making it difficult to judge the accuracy of the *ab initio* models in case of large excess of neutrons or protons. Scarcity of spectroscopic information for many exotic isotopes is mostly related to the experimental difficulties one has to overcome to populate these isotopes and extract useful information. Development of Radioactive Nuclear Beams allowed application of simple resonance reactions, such as elastic scattering or resonance charge exchange reaction for spectroscopy studies of exotic nuclei. The advantage of this approach is mainly related to the fact that resonance reactions have high cross section and provide direct way to extract spectroscopic information. Application of resonance reactions for spectroscopy of exotic nuclei will be considered in two examples: ^{9}C and ^{7}He. The proton rich nucleus ^{9}C was studied via resonance elastic scattering of protons on ^{8}B. Only one excited state was known in ^{9}C before this study. Method of inverse geometry and very thick target was used to obtain the excitation function of p $+^{8}$B elastic scattering up to the excitation energy of 4.5 MeV. The neutron rich nucleus ^{7}He was studied through the T=3/2 Isobaric Analog States in ^{7}Li. These states were populated in resonance charge exchange reaction ^{6}He(p,n)^{6}Li$^{*}(0^{+})$. Two complimentary experimental techniques were developed to measure the excitation function of this process. In one, neutrons are measured in coincidence with γ rays from the decay of 0^{+} excited state of ^{6}Li [1] and in the other Doppler shift of these γ rays is used to extract information on the total cross section and angular distribution of ^{6}He(p,n)^{6}Li(0^{+}) process [2]. [1] G.V. Rogachev, et al., Phys. Rev. Lett. 92, 232502 (2004). [2] P. Boutachkov, et al., Phys. Rev. Lett. 95, 132502 (2005).