



NUSTAR Seminar

Jose Luis Rodriguez Sanchez

University of Santiago de Compostela, Spain

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Zoom Link

<https://gsi-fair.zoom.us/j/92276015997>

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Isobaric charge-exchange reactions: a tool to study the excitation of baryonic resonances in exotic nuclear matter

Nucleonic excitations play an important role in many and diverse facets of nuclear science such as the definition of three body forces [1], the quenching of the Gamow-Teller strength [2], or the description of relativistic heavy-ion collisions by using transport codes [3]. Recently, it has also been pointed out the direct role of the lowest-energy nucleon excitations, the so-called Δ -isobars, in the composition of neutron stars [4]. In this seminar, I will do a short overview about the most important experiments performed at the Laboratoire National SATURNE (Saclay, France) and at the GSI facility to investigate the excitation of baryonic resonances in nuclear matter by using isobaric charge-exchange reactions, reporting on the recent results obtained from isobaric charge exchange reactions induced by tin projectiles in thin targets of C, CH₂, Cu, and Pb at energies of 1A GeV [5]. The measurements were performed with the fragment separator FRS and allowed us to investigate the excitation of the $\Delta(1232)$ resonance in the target and projectile nuclei. The excellent momentum resolution of the FRS allowed us to obtain with high accuracy the missing-energy distributions of the residual nuclei, in particular, for the (p,n) and (n,p) single isobaric charge-exchange channels. These missing-energy distributions show two components corresponding to the quasi-elastic and inelastic charge-exchange channels, which are used to extract information about the produced resonances (masses, production cross sections, etc). In addition, new ideas for the investigation of baryonic resonances at FAIR will also be presented.

[1] H. Krebs, et al., *Phys. Rev. C* 98, 014003 (2018).

[2] H.Z. Liang, et al., *Phys. Rev. C* 98, 014311 (2018).

[3] G.C. Yong, et al., *Phys. Rev. C* 93, 044610 (2016).

[4] A. Drago, et al., *Phys. Rev. C* 90, 065809 (2014).

[5] J.L. Rodriguez-Sanchez et al., *Phys. Lett. B* 807, 135565 (2020).

Convener: T. Dickel

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