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(G*) A Probe for Collectivity: Investigation of States Populated in the 102Ru(p,t)100Ru Two Neutron Transfer Reaction

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A ubiquitous goal of nuclear physics, within the context of nuclear structure, is to provide an informed characterization of the behaviour of collectivity throughout the chart of nuclides. This initiative continues to present as extraordinarily non-trivial, especially when considering regions of heavy nuclei, as such nuclei are highly unique many-body systems with a complex array of properties. The investigation herein focuses on the study of the structure of 100Ru via the two-neutron transfer reaction, 102Ru(p,t)100Ru, that was performed using the Q3D magnetic spectrograph at the Maier-Leibnitz Laboratory, in Garching, Germany. The removal of the pair of particles from the system provides a direct study of the neutron-pair properties of the states that were observed in the reaction, which yields a more robust understanding of the pairing correlations present in 100Ru. These pairing correlations are a prime diagnostic used to characterize the behaviour of collective states within the context of the shell model, and can therefore be used to investigate how this feature evolves in different Z areas of the chart of nuclides. The study of the excited states of 100Ru extends further in another context, as it can add to the understanding of the double beta decay process of 100Mo to excited states of 100Ru. This investigation has significance with respect to the possibility of using 100Mo as a probe of the neutrinoless double-beta-decay process, which would shed light on the fundamental nature of neutrinos. This topic has the potential to offer high-impact deliverables, arising from the fact that it affects a wide breadth of sub-fields of physics outside that of nuclear structure, such as astrophysics and particle physics. This presentation will highlight the results from the analysis of the 102Ru(p,t)100Ru reaction, along with their significance for fundamental nuclear structure.

Keyword-1

Nuclear Structure

Keyword-2

Transfer Reaction

Keyword-3

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