Contribution ID: **73** Type: **Contributed Oral**

The Experimental Study of Shape Coexistence in 114Sn Using the GRIFFIN Spectrometer

Saturday, 18 February 2023 12:00 (15 minutes)

The nucleus, made up of protons and neutrons, exhibits a shell-like structure consisting of orbitals described by quantum mechanics. This has been demonstrated by extensive experimental observables, which reveal that nuclei possessing specific "magic numbers" of neutrons or protons exhibit particular characteristics well described in the nuclear shell model. The tin isotopes, with a closed proton shell at Z=50, are an ideal testing ground for shell model calculations as the isotopic range extends from the doubly-magic 100Sn through 132Sn. The singly-magic nucleus 114Sn, with N=64, is situated in the neutron mid-shell between the N=50 and N=82 magic numbers. The known even-even isotopes of tin are described as possessing a spherical shape in their ground state, however, those isotopes situated in the neutron mid-shell gap also exhibit excited states with properties characteristic of deformed shapes. This phenomenon is also known as shape coexistence. Here the deformed shape arises via 2-particle 2-hole excitation across the Z=50 proton shell gap. This deformed shape gives rise to rotational intruder-bands identified by excited 0+ states presenting at low excitation energies. A recent experimental study of 116Sn suggested a reevaluation of the properties of these intruder bands, while key information on 114Sn remains missing. To investigate the characteristics of these intruder bands, the competing beta-decay and electron capture of 114Sb was exploited to populate excited states in 114Sn at TRIUMF's ISAC facility in 2019. The decay to excited states and subsequent decays by gamma-ray emission were measured using the GRIFFIN spectrometer and its suite of ancillary detectors. The experiment pursued a more in-depth understanding of the intruder configurations and their band-heads in 114Sn with an intention to draw parallels to the recent findings in the other mid-shell even-even tin isotopes. Here, the current state of analysis and recent findings will be presented.

Supervisor

Dr. Corina Andreoiu

Funding Agency

NSERC

Supervisor Email

corina_andreoiu@sfu.ca

Your Email

dannen@sfu.ca

Primary author: ANNEN, Dominic (Simon Fraser University)

Co-authors: Dr ANDREOIU, Corina (Simon Fraser University); Dr SPAGNOLETTI, Pietro (Simon Fraser University)

Presenter: ANNEN, Dominic (Simon Fraser University)

Session Classification: February 18 Morning Session

Track Classification: Nuclear Structure