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High-statistics β-decay study of collectivity in ^{122}Xe (student talk)

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The evolution of the simple collective signature, the excited first 2^+ state energy, is extraordinarily smooth for the nuclei in the Z>50, N<82 region, which is expected to be an ideal region to test collectivity. The study of ^{122}Xe is a part of a systematic examination of the development of collectivity in the Xe isotopes which are located in the region. Detailed investigations of nuclear structure in the Xe isotopes reveal a pairing vibrational structure influenced by proton subshell gaps. In particular, the 0_3^+ states in $^{124-132}$Xe are very strongly populated in (^{3}He,n) reactions [1], suggesting a pairing vibrational structure. Recent work on ^{124}Xe [2] has established nearly identical quadrupole collectivity for the pairing vibrational 0_3^+ band and the ground state band. The collectivity of excited states in ^{122}Xe is not well characterized because of a general lack of spectroscopic data for low- and high-spin states, which provide measures of collective properties.

The experiment to study ^{122}Xe with the β^+/EC decay of ^{122}Cs was performed at the TRIUMF-ISAC facility located in Vancouver, B.C., Canada. The data collected have enabled the observation of about 505 new transitions and about 250 new levels, including around 145 new high-spin states. The results on the establishment of the 2^+ band members of the 0_2^+ and 0_3^+ bands, observation of important, but previously unobserved, $2_2^+ \rightarrow 0_2^+$ and $2_3^+ \rightarrow 0_3^+$ transitions [3], and the confirmation of the spin of the 0_3^+ state [4] are reported. In addition, the present work is focused on newly observed high-spin states of ^{122}Xe.

[1] W.P. Alford, *et.al.*, Nucl. Phys. A**323**, 339 (1979).

[2] A.J. Radich *et.al.*, Phys. Rev. C**91**, 044320 (2015).

[3] B. Jigmeddorj *et.al.*, Web of Conf. 107, 03014 (2016)

[4] B. Jigmeddorj *et.al.*, Physics Procedia 90 (2017)

Primary author: JIGMEDDORJ, Badamsambuu (University of Guelph)

Co-authors: GARNSWORTHY, Adam (TRIUMF); RADICH, Allison (University of Guelph); HADINIA, Baharak (McMaster University, University of Guelph); SVENSSON, Carl (University of Guelph); ANDREOIU, Corina (Simon Fraser University); CROSS, David (Simon Fraser University); RAND, Evan (Chalk River Laboratories, University of Guelph); BALL, Gordon (TRIUMF); PATK, Jason (Lund University, University of British Columbia, TRIUMF); PORE, Jennifer (Lawrence Berkeley National Laboratory, Simon Fraser University); WOOD, John (Georgia Institute of Technology); MOUKADDAM, Mohamad (University of Surrey, TRIUMF); RAJABALI, Mustafa (Tennessee Technological University, TRIUMF); GARRETT, Paul (University of Guelph); VOSS, Philip (Albion College); YATES, Steven (University of Kentucky); BRUHN, T (Simon Fraser University, TRIUMF); RIZWAN, Usman

(Simon Fraser University); WANG, Zhimin (Simon Fraser University, TRIUMF)

Presenter: JIGMEDDORJ, Badamsambuu (University of Guelph)

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