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# First results from CLARION2-TRINITY: Coulomb Excitation of 49Ti and the proton-neutron interaction

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The first results from CLARION2-TRINITY, a new charged-particle and HPGe array are presented: Coulomb excitation of $^{49}$Ti. Ti-49 can be treated as a neutron hole plus semimagic $^{50}$Ti core within the particle-core coupling scheme. Reduced electric quadrupole transition probabilities, or $B(E2)$ strengths, for the $2^+ \otimes f_{7/2}$ multiplet members and candidate $p_{3/2}$ state were measured. The total electric quadrupole strength of $^{49}$Ti is compared to the $B(E2; 0^+ \rightarrow 2^+)$ of the $^{50}$Ti core in search of enhanced quadrupole collectivity, similar to that recently observed in $^{129}$Sb relative to a $^{128}$Sn core [1]. Both cases are near double-magic nuclei and have small core $B(E2)$ values. The results are compared to shell-model calculations with state-of-the art nucleon-nucleon interactions. Any enhancement is in stark contrast to the expectations of the successful particle-core coupling scheme and it is thought to arise when the long-range part of the proton-neutron (PN) residual interaction rapidly develops compared to the short-range pairing interaction (PP or NN). Enhanced electric quadrupole strength is an early signal of the emerging nuclear collectivity that becomes dominant away from the shell closure.

[1] T.J. Gray, et al., Phys. Rev. Lett. 124, 032502 (2020)

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