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# Isomeric states close to $^{78}$Ni studied via high-precision mass measurements

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Isomers close to the doubly magic nucleus 78Ni (Z=28, N=50) provide essential information on the shell evolution and shape coexistence far from stability. We have performed high-precision mass measurements of isomeric states close to 78Ni with the JYFLTRAP double Penning trap mass spectrometer [1] at the Ion Guide Isotope Separator On-Line (IGISOL) facility. The existence of a long-lived isomeric state in 76Cu has been debated for a long time. We confirm the existence of such an isomeric state with an excitation energy Ex=64.8(25) keV [2]. Based on the ratio of detected ground- and isomeric-state ions as a function of time, we show that the isomer is the shorter-living state previously considered as the ground state of 76Cu. In addition to 76Cu, we measured the 1/2+ isomeric state of 79Zn. This isomer is known to be strongly deformed [3]. We place it unambiguously at 942(10) keV, slightly below the 5/2+ state at 983(3) keV. Using the state-of-the-art shell-model calculations, the 1/2+ isomer in 79Zn is interpreted as the bandhead of a low-lying deformed structure akin to a predicted low-lying deformed band in 80Zn. The results show the importance of high-precision mass measurements as pinning down the excitation energies of long-living isomeric states and give support for shape coexistence in the 78Ni region.

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**Primary author(s) :** Prof. KANKAINEN, Anu (University of Jyväskylä); CANETE, L. (University of Jyväskylä); GIRAUD, S. (GANIL); BASTIN, B. (GANIL); NOWACKI, F. (Université de Strasbourg); ASCHER, P. (LP2i); ERONEN, T. (University of Jyväskylä); GIRARD ALCINDOR, V. (GANIL); JOKINEN, A. (University of Jyväskylä); KHANAM, A. (University of Jyväskylä); MOORE, I.D. (University of Jyväskylä); NESTERENKO, D. (University of Jyväskylä); DE OLIVEIRA, F. (GANIL); PENTTILÄ, H. (University of Jyväskylä); PETRONE, C. (Department of Physics); POHJALAINEN, I. (University of Jyväskylä); DE ROUBIN, A. (University of Jyväskylä); RUBCHENYA, V. (University of Jyväskylä); VILEN, M. (University of Jyväskylä); ÄYSTÖ, J. (University of Jyväskylä)

**Presenter(s) :** Prof. KANKAINEN, Anu (University of Jyväskylä)

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