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Collectivity in the Vicinity of 78Ni: Coulomb Excitation of Neutron-rich Zn at HIE-ISOLDE

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Nuclei in the vicinity of 78Ni have recently been in focus of many experimental and theoretical investigations. In particular, the neutron-rich Zn isotopes, only two protons above the Ni isotopic chain, are ideally suited to study the evolution of the Z = 28 proton shell gap, and the stability of the N = 50 neutron shell gap. In the last decade, several experiments were performed to study the collectivity in the even-even Zn isotopes between N = 40 and N = 50 [1-4], but their results are not consistent; consequently, the evolution of nuclear structure in the neutron-rich Zn nuclei is not fully understood.
The ISOLDE facility finished in 2016 the first phase of a major upgrade in terms of the energy of post-accelerated exotic beams bringing it up from 3 MeV/u to 5.5 MeV/u. The increased beam energy strongly enhances the probability of multi-step Coulomb excitation, giving experimental access to new excited states and bringing in-depth information on their structure.
The very first HIE-ISOLDE beam experiment in October 2015 and its continuation in 2016 have been dedicated to the study of the evolution of the nuclear structure along the zinc isotopic chain. The preliminary results discriminate between the two experimental values of B(E2; 4+ ⟶ 2+) in 74Zn, and yield for the first time a B(E2; 4+ ⟶ 2+) value in 78Zn.
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Primary authors: Dr ILLANA SISON, Andres (KU Leuven); Dr ZIELINSKA, Magda (CEA Saclay)

Co-authors: Prof. HUYSE, Mark (KU Leuven); Prof. VAN DUPPEN, Piet (KU Leuven)

Presenter: Prof. VAN DUPPEN, Piet (KU Leuven - IKS)

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