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Structure of neutron-rich Ge isotopes in vicinity of the double-magic 78Ni nucleus.

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Experimental studies of excited states have been performed to probe the evolution of the shell structure in neutron-rich nuclei. In the case of N=50 isotopes from ^{90}Zr to ^{78}Ni, specific excited states correspond mainly to neutron excitations across the N=50 gap. Thus, the evolution of the excitation energy of these states, particularly in the ^{82}Ge nuclei, enables to deduce the size of the N=50 gap. In addition, information on the collective or single-particle (particle - hole configuration) nature may be obtained in odd Ge isotopes on both sides of the N=50 gap (^{81}Ge and ^{83}Ge).

A large data set of neutron-rich nuclei is produced in a fusion-fission reaction with ^{238}U beam (at 6.2 MeV/u) impinging a ^{9}Be target. The several fission fragments are selected unambiguously (A and Z identification) by the VAMOS++ spectrometer. The prompt gamma rays are detected in coincidence with the fission fragments by the AGATA array composed of 8 triple-clusters.

The experimental results are compared with the most advanced shell-model calculations using the most updated interaction for this region in the nuclear chart.

The structure of these N=49 and N=51 nuclei has already been investigated through beta-decay, Coulomb excitation, and nucleon-transfer experiments. However, their high-spin states have not yet been studied using prompt gamma-ray spectroscopy. Indeed, for the first time, the level schemes of various neutron-rich Ge isotopes (N=49, N=50, and N=51) and 79Zn (N=49) will be presented and discussed in the light of theoretical calculations.

Collaboration:
G. Duchêne, J. Dudouet, D. D. Dao, F. Nowacki, E. Clément, A. Lemasson, C. Andreoiu, A. Astier, G. de Angelis, G. de France, C. Delafosse, I. Deloncle, Z. Dombradi, C. Ducoin, A. Gadea, A. Gottardo, D. Guinet, B. Jacquot, P. Jones, T. Konstantinopoulos, I. Kuti, A. Korichi, S. M. Lenzi, G. Li, F. Le Blanc, C. Lizarazo, R. Lozeva, G. Maquart, B. Million, C. Michelagnoli, D. R. Napoli, A. Navin, R. M. Pérez-Vidal, C. M. Petrache, N. Pietralla, D. Ralet, M. Ramdhane, M. Rejmund, O. Stezowski, C. Schmitt, D. Sohler, and D. Verney.

Primary author: DIDIERJEAN, Francois (University of Strasbourg - IPHC)

Presenter: DIDIERJEAN, Francois (University of Strasbourg - IPHC)

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