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AGATA@GANIL(E708) (ONLINE): Evolution of collectivity around N=40: lifetime measurements in 73,75Ga

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The experiment E708 was performed in GANIL in 2016, aiming to investigate evolution of collectivity in odd mass Ga isotopes around N=40 and neighbouring nuclei. The lifetime measurements of the low-lying states in nuclei of interest would allow us to deduce the transition probabilities and extend our knowledge of the interplay between single-particle and collective degrees of freedom in this mass region.

Low-lying states in ^{73,75}Ga and neighbouring nuclei were populated
in deep-inelastic reaction in inverse kinematics with a ^{208}Pb beam at 6.63 MeV/A impinging on a 0.95 mg/cm^2 thick ^{76}Ge target.
The experiment was performed with the AGATA tracking array coupled to the VAMOS++ spectrometer which allowed us to detect the gamma-rays in coincidence with recoils emitted in the
deep-inelastic reactions. Lifetime measurements were performed using the differential plunger device from University of Cologne and by applying the Recoil Distance Doppler Shift method.

The main physics goal, lifetime measurement of $5/2^-$ state in ^{73}Ga and ^{75}Ga using $\gamma\gamma$ coincidence data was not reached due to an order of magnitude lower beam intensity than proposed one. Nevertheless, lifetimes of $5/2^-$ state in ^{73}Ga and ^{75}Ga were determined by γ singles.
Measured lifetime and deduced transition probabilities of the $5/2^-_1$ state in ^{73}Ga support the argument of the M1 dominant nature of the $5/2^-_1 \rightarrow 1/2^-$ transition. Low-lying states in ^{70,72,74}Zn were analyzed by γ singles and the systematic discrepancy between B(E2;$4^+ \rightarrow 2^+$) values
measured by Coulomb excitation and plunger technique was investigated. Obtained results
are in agreement with those of previous plunger experiments. In addition, lifetimes of the low-lying states of germanium isotopes $^{75-79}$Ge were extracted using γ singles data.

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