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Title: **The structure of high-Z nuclei from studies with GAMMASPHERE at ATLAS**

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This presentation will review one of the main research programs carried out with the Gammasphere array at ATLAS. Taking advantage of the availability of very heavy beams on the one hand, and of the coupling of Gammasphere with the Fragment Mass Analyzer on the other, it was possible to gain new insights into the properties of actinide and transfermium nuclei.

Coulomb excitation measurements with ^{207,208}Pb beams at energies $\sim$15% above the barrier have been carried out on ^{232}Th and on long-lived Pu targets with A = 239, 240, 242, and 244. In addition to the target excitations, transfer channels leading to ^{238,241,243}Pu were studied as well. With a ^{209}Bi beam, the level structures of ^{237}Np, ^{241}Am and of the one-proton transfer channel leading to ^{242}Cm were investigated. Several surprising results concerning the behavior of the negative parity bands and of band structures built on the first excited 0^+ states will be discussed.

The recoil decay tagging technique was used to study not only the yrast structure of Z=102 isotopes ^{253}No and ^{254}No, but also the entry distributions using ^{48}Ca + ^{207,208}Pb fusion-evaporation reactions. The results confirm that the shell-correction energy responsible for the stability of No is partly derived from deformation. Based on a novel approach to determine a lower bound of the barrier height, the measured entry distributions provide direct information on the reaction mechanism(s), the fission barrier and the shell-correction energy. The results will be compared with theoretical expectations.

Finally, several single-particle and vibrational states above the N = 152 subshell gap were investigated by combining the results from α-γ spectroscopy following the decay of ^{255}Fm to ^{251}Cf with cross section data for the ^{250}Cf(d,p) reaction.

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$\boxed{\text{Invited talk}}$