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Lifetime measurements in neutron-rich Pb isotopes. The role of the effective three-body forces

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Abstract: This proposal aims to investigate the shell evolution in the region of the double magic 208Pb isotope involving the neutron g9/2 shell through the lifetime determination of the lowest lying yrast excited states in 212Pb and 208Hg isotopes. In particular, the main goal will be to determine the B(E2 : 4+ ⟶ 2+) and B(E2 : 2+ ⟶ 0+) transition strengths in 212Pb and 208Hg isotopes and to compare with recent large-scale shell-model calculations to evaluate the performance of the effective three-body forces in heavy systems.
The neutron-rich isotopes will be produced by a multinucleon-transfer reaction in direct kinematics, employing a 136Xe beam, impinging onto a 208Pb target. The target will be mounted with an Nb degrader foil in a compact inverse Plunger device, which was successfully tested at LNL in the summer of 2022. The lifetime of the excited states of interest will be determined using the recoil distance Doppler shift method. The AGATA array will be used to measure the γ rays while the beam-like recoil nuclei will be identified with the PRISMA spectrometer.

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