

Lifetime measurements for the study of intruder states towards the island of inversion along the $N = 20$ shell closure

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Lifetime measurements are commonly used to unravel the nature and properties of nuclear states, as they are closely related to transition probabilities, which provide information on the nuclear wave functions. The aim of the experiment here presented was to study the interplay of spherical ($0 \hbar\omega$) and intruder ($2 \hbar\omega$) configurations in the low-lying states of isotopes on the edge of the $N=20$ island of inversion. In particular, the goal was to determine the lifetime of the first two $2+$ states of Si and the first $5/2+$ state of ^{35}P using the **Doppler Shift Attenuation Method**. The experiment was conducted at the LNL facility in November 2022, employing the PRISMA magnetic spectrometer and the AGATA array.

This presentation provides an overview of the first-step analysis of the experiment, which involved the AGATA and PRISMA data processing and the optimization of the AGATA GEANT4 simulation, which was adapted to mimic the experimental conditions.

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