

Accessing neutron-rich nuclei close to ^{208}Pb

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The region of the nuclear chart close to the doubly-magic ($Z = 82, N = 126$) ^{208}Pb nucleus is at the center of extensive experimental and theoretical investigations, connected both to nuclear structure, astrophysics and reaction mechanism studies. The experimental information concerning low-lying excited states of nuclei in this region is still extremely scarce and in most cases limited to isomeric states identified in fragmentation reactions.

Multi-nucleon transfer (MNT) reactions at energies close to the Coulomb barrier have been indicated as a promising tool to perform detailed spectroscopy of these nuclei but the best experimental conditions to enhance the survival probability of the primary heavy fragments to secondary processes like neutron evaporation and fission is still under debate.

We propose to use the $^{208}\text{Pb} + ^{130}\text{Te}$ reaction in inverse kinematics at $\sim 10\%$ above the Bass barrier to populate nuclei close to ^{208}Pb , in particular with $Z < 82, N \geq 126$. The main focus of the proposed experiment is the detailed spectroscopy of the $N = 126, 127$ nuclei $^{206,207}\text{Hg}$ nuclei and ^{208}Tl and the determination of the cross sections for the population of neutron-rich nuclei in the $N = 126$ region with the selected reaction.

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