

eurorib'10

Contribution ID: 52

Type: oral

Spectroscopy of neutron-rich lead nuclei

Monday, 7 June 2010 12:00 (20 minutes)

The neutron-rich lead region is of exceptional interest to trace the evolution of single-particle levels and the residual proton-neutron interaction beyond the doubly magic ^{208}Pb . While ^{208}Pb is well understood in terms of the shell model, experimental data on the heavier isotopes are very scarce[1,2].

Another crucial aspect that calls for further experimental information is the evaluation of beta-decay half lives for neutron-rich nuclei with $A > 215$. These half lives are particularly needed for r-process calculations as an essential test to validate the nuclear and beta-decay models away from stability[3].

In this talk results from a recent RISING experiment aiming at studying neutron-rich lead isotopes with $A > 210$ will be reported.

The experiment employed the active stopper configuration of the RISING array in order to study both isomeric gamma decay of long-lived states and the beta decay of heavy lead and bismuth isotopes.

The nuclei of interest were populated by relativistic fragmentation of ^{238}U at 1 GeV/u on a Be target. The ions of interest were transported in the GSI FRS separator [4] and implanted in an active catcher consisting of 9 Silicon DSSSD. The gamma decay after implantation was measured by the 15 Cluster HPGe detectors of the RISING array [5,6].

New isomers have been identified in the populated Pb, Bi and Tl isotopes, and their lifetime and isomeric ratios are being evaluated. Comparison with shell model calculations will be presented.

- [1]M. Pfutzner et al., Phys. Lett. B 444 (1998) 32-37.
- [2]Zs. Podolyak, Acta Physica Polonica B36 (2005) 1269.
- [3]I.N. Borzov, Phys. Rev. C 67 (2004) 025802.
- [4]H. Geissel et al., Nucl. Instr. Meth. B70 (1992) 286.
- [5]S. Pietri et al., Nucl. Instr. Meth. B 261 (2007) 1079.
- [6]R. Kumar et al., Nucl. Instr. Meth. A 598 (2009) 754.

Is this an invited talk? (please answer yes or no)

no

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no

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yes

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Session Classification: Shell Structure Far From Stability II

Track Classification: Shell structure far from stability