

In-beam gamma-ray spectroscopy of ^{134}Sm

P. Sekrecka¹, A. Malinowski^{1,2}, M. Palacz¹, A. Fijałkowska², G. Jaworski¹, I. Kuti³, and B. Saygi⁴

¹*Heavy Ion Laboratory, University of Warsaw, Warsaw, Poland*

²*Faculty of Physics, University of Warsaw, Warsaw, Poland*

³*HUN-REN Institute for Nuclear Research (HUN-REN ATOMKI), Debrecen, Hungary and*

⁴*Ankara University, Institute of Nuclear Sciences, Ankara, Turkey*

An experiment to study the ^{134}Sm nucleus was carried out in January 2024 at the Heavy Ion Laboratory, University of Warsaw, using the EAGLE [1] gamma spectrometer in conjunction with NEDA [2,3] neutron and DIAMANT [4,5] charged particle detectors. The main objective of the experiment is to extend the level scheme of ^{134}Sm to study shape coexistence and gamma vibrational states. In addition, the experiment should explore possible shape differences of ^{134}Sm compared to other Sm isotopes, namely ^{136}Sm [6] and ^{138}Sm [7], arising from the arrangement of protons and neutrons in the $h_{11/2}$ orbitals. Only six yrast excited states of ^{134}Sm are currently known, forming a ground state band with spins and parity up to 12^+ [8].

A 147 MeV beam of ^{32}S was used to bombard an isotopically pure ^{106}Cd target with a thickness of 4.6 mg/cm^2 . In this reaction, two protons and two neutrons should be emitted from the compound nucleus ^{138}Gd to form ^{134}Sm . However, the reaction is dominated by the emission of protons, possibly accompanied by one neutron and/or an alpha particle. The NEDA and DIAMANT arrays are essential to select events of interest. Data analysis is in progress. Preliminary results will be presented.

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