COLLECTIVE EXCITATIONS IN ^{166}RE AND ^{162}W BY MEANS OF GAMMA-RAY SPECTROSCOPY AND LIFETIME MEASUREMENTS

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In this talk, we will present results obtained as side products from the experiment: *Search for non-collective transitions in ^{166}Os*, performed at the Accelerator Laboratory of the University of Jyväskylä, Finland. The aim of the experiment was to measure lifetimes of excited states in neutron-deficient nuclei in the region around ^{166}Os using the recoil distance Doppler shift (RDDS) method [1].

Here, we focus on the investigation of the nuclei of ^{166}Re and ^{162}W. New level schemes of ^{166}Re and ^{162}W have been built with rotational-like bands identified for the first time [2,3]. The yrast band (1) for ^{166}Re has been assigned to the $\pi h_{11/2}[514]9/2^{-}\otimes i_{13/2}[660]1/2^{+}$ Nilsson configuration based on rotational characteristics and electromagnetic properties in comparisons with Woods Saxon mean-field [4,5], particle-rotor model (PRM) [6] and semiclassical calculations [7]. Configuration assignments for band (2) are discussed in terms of two alternative configurations: $\pi h_{11/2}\otimes h_{9/2}$ and $\pi d_{5/2}\otimes i_{13/2}$. Signature inversion is observed in band (2) and well reproduced by PRM calculations with the mixed $\pi h_{11/2}[514]9/2^{-}\otimes[f_{7/2}/h_{9/2}]3/2^{-}$ Nilsson configuration. Further experimental and theoretical studies of this phenomenon are needed. Lifetime measurements have been performed for three levels in the yrast band of ^{166}Re, providing support for the theoretical interpretation of rotational excitations built on the $\pi h_{11/2}[514]9/2^{-}\otimes i_{13/2}[660]1/2^{+}$conguration [8]. Tilted-axis cranking calculations based on a relativistic mean field (TAC-RMF) approach [9] have also been performed in order to investigate the possibility of magnetic rotation in ^{166}Re.

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