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Title: **Violation of the K-selection rules in ^{178}Hf observed via Coulomb excitation.**

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The study of the K-isomer properties with Coulomb excitation attracts recently a great interest. Experiments performed to explain the nature of the well-known long-lived isomer in ^{180}Ta indicate the existence of the intermediate state or states, making possible to depopulate the collective structures built on the isomeric level. Despite the large difference of K quantum number between the ground state and the isomeric state such depopulation has been observed [1, 2]. But intermediate states have not been identified yet.

The other approach to test the K-selection rules is to populate states in an isomeric band starting from a ground state band [3, 4]. Coulomb excitation offers an unique way to search for the intermediate states because, unlike any other nuclear reaction, selectively populates the levels strongly connected to the ground state.

The Coulomb excitation experiment on the ^{178}Hf was performed using the Gammasphere equipped with the particle detector Chico.[5] For the first time discrete transitions in the $K^{\pi}=8^{-}$ isomeric band excited from $K^{\pi}=0^{+}$ ground state were observed. The mechanism of the excitation of the isomeric band is still an open question. It can be explained either by assuming direct E3 excitation or E1 decay from higher lying states of ground state band. The conclusions from the analysis of recent experiments are presented.

References

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