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## High-spin states in $^{212}\text{Po}$ above the alpha-decaying $(18^+)$ isomer

Due to the rather scarcity of spectroscopic data on the trans-fermium region, high-spin studies in the few-particles/holes around the  $Z = 82$ ,  $N=126$  double-shell closure, populating the same high- $j$  orbitals, can provide complementary and crucial information about the single-particle level structure of these nuclei.

A particularly rich phenomenology also arises around the lead double shell closure due to the interplay between the single-particle behaviour and the  $3^-$   $^{208}\text{Pb}$  collective vibration. This collective state lies particularly low in energy, and lowers in energy still with increasing particles added to the valence space [1]. This collective excitation can mix with the single-particle transitions between  $\Delta l = \Delta j = 3\hbar$  orbits, producing particularly fast E3 decays [2].

In this region, the  $^{212}\text{Po}$  isotope level scheme has been known up to a long-lived,  $\alpha$ -decaying  $(18^+)$  state. Two new  $\gamma$  rays have been observed in the excitation spectrum of this isotope using  $\gamma$ -decay spectroscopy with the RISING setup at GSI, Darmstadt. They have been assigned to the  $23^+ \rightarrow 21^- \rightarrow 18^+$  yrast cascade. Lifetime measurement of the two states suggests M2 and E3 assignment to the two transitions. Though with relatively low statistics, these are the first observations of high-spin states above the  $^{212}\text{Po}$   $(18^+)$  isomer, by virtue of the selectivity of the FRS separator obtained via ion-by-ion identification of  $^{238}\text{U}$  fragmentation products. Comparison with shell-model calculations points to shortfalls in the nuclear interactions involving high- $j$  proton and neutron orbitals.

[1] E. Caurier et al., Phys. Rev. C 67 054310 (2003)

[2] I. Bergström, B. Fant, Phys. Scr. 31 (1985)

**Primary authors:** Mr ZAGO, Luca (INFN LNL and University of Padova); GOTTARDO, Andrea (INFN LNL); VALIENTE DOBON, Jose Javier (LNL INFN)

**Presenter:** Mr ZAGO, Luca (INFN LNL and University of Padova)

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