

## Beta-delayed Fission of $^{180}\text{Tl}$

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Detailed studies of three decay modes ( $\alpha$ ,  $\beta^+/\text{EC}$  and beta-delayed fission) of an extremely neutron-deficient isotope  $^{180}\text{Tl}$  were performed at the mass separator ISOLDE (CERN). A novelty and key feature of this work was the production of a pure source of  $^{180}\text{Tl}$  using Resonance Ionization Laser Ion Source (RILIS) of ISOLDE.

In total, approximately  $1.4 \times 10^6$  alpha decays of  $^{180}\text{Tl}$  were detected, which represents approximately 6% alpha-decay branch of this nucleus. Due to high statistics, detailed fine-structure alpha decay studies of  $^{176}\text{Au}$  (a daughter of  $^{180}\text{Tl}$  after  $\alpha$  decay) and of excited states in  $^{180}\text{Hg}$ , populated in the  $\beta^+/\text{EC}$  decay of  $^{180}\text{Tl}$ , were also performed.

The most surprising result of the experiment is the observation of the asymmetric fission fragments mass distribution of exotic nucleus  $^{180}\text{Hg}$  ( $N/Z=1.25$ ), produced after  $\beta^+/\text{EC}$  decay of  $^{180}\text{Tl}$  (see Figure). Interpretation of this interesting phenomenon will be presented based on the recently-developed 5-dimensional approach to fission by P. Möller et al [1].

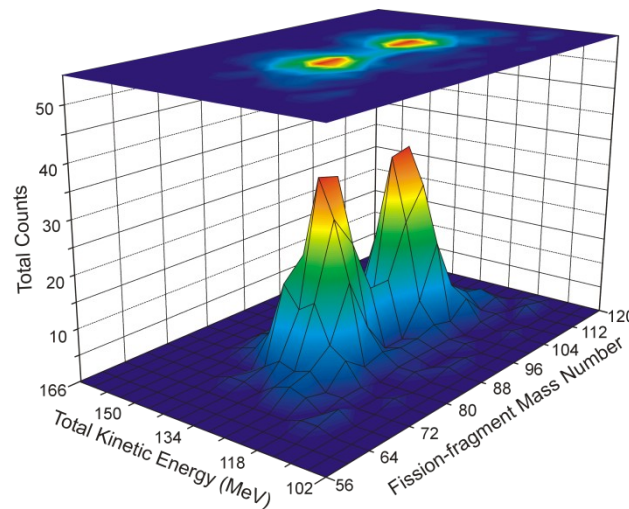


Figure 1: The derived fission-fragment distribution of  $^{180}\text{Hg}$  as a function of the fragment mass and the total kinetic energy.

[1] P. Möller et al., Nuclear fission modes and fragment mass asymmetries in a five-dimensional deformation space, *Nature* 409, 785 (2001).