

# Manifestation of the Fission Dynamics in Muon-Induced Prompt Fission

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In muonic atoms of  $^{238}\text{U}$ , the nuclei can undergo prompt fission through non-radiative transitions [1] of the muon:  $2p - 1s$ ,  $3p - 1s$ ,  $3d - 1s$  etc. Main features of the fission dynamics are studied in prompt fission: augmentation of the barrier, dynamics of the saddle-to-scission descent, muonic conversion and characteristic X-rays from fission fragments supply information on the multipolarity of electromagnetic transitions and charge distribution, structure of nuclear transition currents. Revision of the non-radiative transition probabilities comprises my present purpose.

It is commonly accepted that the probability of the non-radiative nuclear excitation in the muonic transition  $i \rightarrow f$  can be expressed in terms of the photoexcitation cross-section and resonance internal conversion coefficients [2]. In this way, satisfactory agreement is attained with experiment [3] for non-radiative transition widths for the  $2p-1s$  transitions in  $^{238}\text{U}$ . However, the  $3p-1s$  radiative transition width turns out to be by a factor of 15 larger than experimental one. I undertake detailed analysis of this circumstance on the basis of Ref. [4]. First, this broadening is not only due to the additional contribution of the non-radiative transition, but also the admixed GDR nuclear width gives a contribution. And that width is of the order of MeV. Second, there is level doubling due to the non-radiative interaction, with the related broadening of the second radiative component within MeV scale due to the GDR total width. Moreover, the nucleus gets excited, properly speaking, not in the  $3p-1s$  transition, but rather in the preceding cascade transition to this state, like  $4d-3p$ , even  $3d-3p$  (virtually) or similar. Correspondingly, some missing intensities should manifest themselves in these transitions.

## References

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