

M5.1 Experiment results for neutron and proton-induced reactions

The analysis of data obtained in the reaction $^{232}\text{Th}(p, f)$ at proton-beam energies $E_p = 13, 20, 40,$ and 55 MeV is finished, and the primary mass distributions, the double differential neutron spectra and neutron multiplicities have been obtained. That data are useful for the fission-model improvement and for the analysis of a ^{232}Th target option. The results have been partially published during the present reporting period:

- E.M.Kozulin et al., “*Fission dynamics in the proton induced fission of actinide nuclei at intermediate energies*”. In: Proc. International Conference on Reaction Mechanisms and Nuclear Structure at the Coulomb Barrier. Fusion06, S.Servolo, Venezia, Italy, March 19-23, 2006, Editors: L. Corradi et al. AIP Conference Proceedings Volume 853 p.336-341, 2006.

- A.A.Bogachev et al., “*Proton-induced fission of actinide nuclei at intermediate energies*”, International Conference on Dynamical Aspects of Nuclear Fission October 2 - 6, 2006 Smolenice Castle, Slovak Republic, to be published World Scientific, Singapore, Eds. J.Kliman, L.Krupa, S. Gmuca, 2007.

- A.A. Bogachev et al., “*Dynamics and fission modes in proton induced fission of transactinide nuclei at intermediate energies*”, In: Proc of the International Symposium on Exotic Nuclei. “EXON - 2006” Khanty-Mansiysk, 17-22 July 2006, Eds.: Yu.E. Penionzhkevich, E.A. Cherepanov, World Scientific, Singapore, 2007.

The proposal “Fragment mass distribution in $^{238}\text{U}, ^{232}\text{Th}(d, pf)$ reaction at intermediate energy” was submitted to INFN-LNS and approved by the LNS PAC. The experiment is supposed to be carried out in March 2007.

The analysis of data obtained in reaction $^{238}\text{U}(p, f)$ with the novel method for determining the independent fission product yields utilising a Penning trap is in the progress. At $E_p = 25$ MeV the yields for elemental chains with $Z = 32-50, 53, 54, 56,$ and 57 have been measured. In the 50 MeV proton-induced fission the independent yields were measured for the elemental chains with $Z = 30-37, 40,$ and 55 . The experimental results for the Zr, Mo, Sn, and Cs chains together with the calculations using the **FIPRODY** code are shown in *Figure 1*.

Results have been presented in the RNB7 Conference, Cortina, Italy, July 2006. Two publications (in addition to the RNB7 Conference proceedings article, which will be published in a special issue of EPJA) are in preparation, one for the method and the other one for the yields and cross sections.

The proposal “Fission yields in fast neutron induced fission of ^{238}U ” has been submitted to the JYFL Accelerator laboratory PAC. The proposal was approved and the experiment is foreseen to be carried out in early 2007.

Comparison with IGISOL_TRAP data in $^{238}\text{U}(p, f)$ at $E_p=25$ MeV

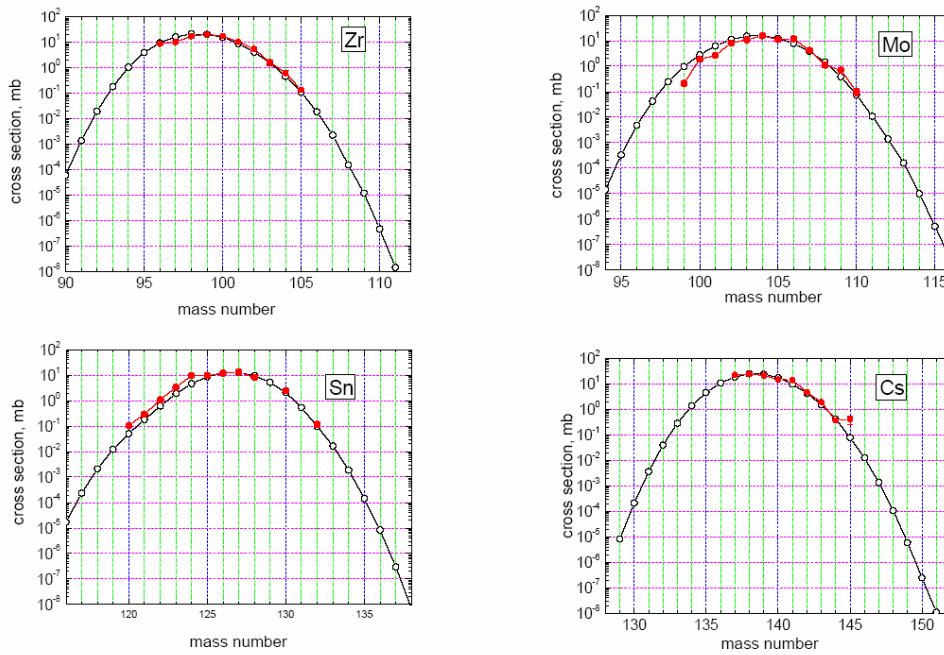


Figure 1. The experimental (solid points) and calculated using the **FIPRODY** code (open circles) yields for the Zr, Mo, Sn, and Cs chains in $^{238}\text{U}(p(25\text{ MeV}, f)$ reactions.