The ^{237}Np(n,f) cross section at the CERN n-TOF facility

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The investigation of neutron-induced reactions is of considerable importance in several fields of fundamental and applied Nuclear Physics. The main technological applications are related to the design of innovative Accelerator Driven Systems (ADS) for the future production of clean and safe nuclear energy as well as for nuclear waste incineration [1,2]. Neptunium-237 is the most important actinide in the problem of spent fuel transmutation and the existing (n,f) data in literature present many discrepancies.

^{237}Np(n,f) cross sections have been measured relative to ^{235}U and ^{238}U fission cross sections, at the n-TOF facility, a spallation neutron source built at CERN with a high intensity flux and an extensive neutron energy range (from eV to GeV) and an excellent time resolution. A fast ionization chamber (FIC) was used as a fission fragment detector with registration efficiency of not less than 97% [3]. The ionization detector was equipped with fast electronics including time-digital converters (TDC) and Flash Analog to Digital Converters (FADC). TDC were used for neutron energy range from 0.1 eV to 1 MeV, while FADC have been used for measurements above 20 KeV. An adapted analysis procedure has been developed to obtain the relative fission cross sections of the measured actinides [4]. Reliable ^{237}Np(n,f) cross section measurements, from a preliminary analysis of the row data, have been deduced in the energy range 20 keV to ~10 MeV and will be presented along with data from literature.

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