

## Nuclear data studies for ADS within ISTC Projects 609 (completed) and 1971 (new):

### Neutron-induced fission of $^{233}\text{U}$ , $^{238}\text{U}$ , $^{232}\text{Th}$ , $^{239}\text{Pu}$ , $^{237}\text{Np}$ , $^{\text{nat}}\text{Pb}$ and $^{209}\text{Bi}$ relative to $^{235}\text{U}$ in the energy range 1-200 MeV

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### Neutron-induced fission cross-sections of $^{240}\text{Pu}$ , $^{243}\text{Am}$ and W in the energy range 1-200 MeV

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The purpose of this projects is to obtain neutron fission cross-sections of  $^{233}\text{U}$ ,  $^{238}\text{U}$ ,  $^{232}\text{Th}$ ,  $^{239}\text{Pu}$ ,  $^{237}\text{Np}$ ,  $^{\text{nat}}\text{Pb}$  and  $^{209}\text{Bi}$  in case of Project 609 and  $^{240}\text{Pu}$ ,  $^{243}\text{Am}$  and W in case of Project 1971 relative to  $^{235}\text{U}$  by means of new measurements in the energy range from 1 MeV to 200 MeV. These isotopes have been chosen for present investigation according to the Nuclear Data Request List for new JENDL High Energy File (JENDL-3.3). The values of the cross-sections to be obtained are intended for use as nuclear data for accelerator-driven transmutation and energy production problem, as well as for the problem of secondary standard in intermediate energy region and some other applications. The Project 609 has been completed successfully and measured fission cross-sections have been published [1]. The Project 1971 is at the very beginning now.

The experimental part of the Projects includes: preparation of fissile targets, measurements, experimental data processing and production of the neutron induced fission cross-sections for isotopes mentioned above relative to  $^{235}\text{U}$  in the energy range 1-200 MeV. The measurements are carried out at the time-of-flight neutron spectrometer GNEIS [2] in Gatchina based on the 1-GeV proton synchrocyclotron of PNPI used as a white neutron source. The fission cross-section ratios are measured simultaneously for several isotopes using two multiplate fission ionization chambers. For actinide targets, the threshold cross-section method and evaluated data below 14 MeV are used for normalization of the shape measurement data. For Pb, Bi and W targets, an absolute normalization of the measured cross-section ratios is done using the thickness of the targets and detection efficiencies. The values of fission cross-section ratio are obtained with statistical accuracy 1-3 % and systematic one 3-10 % and then convert to absolute cross-sections using the evaluated and recommended fission cross-section of  $^{235}\text{U}$ .

At present, the world scientific community disposed only a few neutron sources suitable for the neutron fission cross-sections measurements at intermediate energies. Such measurements are very expensive and therefore have a high priority within the framework of international cooperation. Besides the scientists from institutions of CIS countries, the specialists from Japan Atomic Energy Research Institute were involved in the Project 609 and from Los Alamos National Laboratory will be involved in the Project 1971.

### References:

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2. N.K. Abrosimov, G.Z. Borukhovich, A.B. Laptev, V.V. Marchenkov, G.A. Petrov, O.A. Shcherbakov, Yu.V. Tuboltsev, V.I. Yurchenko, *Nucl. Instrum. Meth.* **A242** (1985) 121.