

A New Method of Prompt Fission Neutron Energy Spectrum Unfolding

O. V. Zeynalova

*Moscow State Institute of Radioengineering, Electronics and Automation, Russia
and Joint Institute for Nuclear Research, Dubna, Russia*

Sh. Zeynalov

Joint Institute for Nuclear Research, Dubna, Russia

F.-J. Hambsch

*EC-JRC-Institute for Reference Materials and Measurements
Retieseweg 111, B-2440 Geel, Belgium*

A new method of prompt fission neutron spectrum unfolding was developed and tested with a $^{252}\text{Cf}(\text{sf})$ source mounted on the common cathode of a twin double ionization chamber, used as a fission fragment spectrometer. The experimental method allowed the simultaneous measurement of two correlated fission fragment kinetic energies along with the determination of the angle of the fission axis in respect to the common cathode normal. Based on the neutron detector allocation along the ionization chamber axis, the kinematics of the neutron emission from the fission fragment was reconstructed in both laboratory and fission fragment reference systems. The neutron velocity was measured by the time-of-flight method as the time interval between the ionization chamber cathode and the neutron detector signals. The neutron time-of-flight distribution versus the neutron detector signal pulse height was investigated to obtain the neutron time-of-flight response function. The measured response function was then used for prompt fission neutron energy spectrum unfolding with the help of a special Monte-Carlo procedure.

→ ∞ ◇ ∞ ←