ID de la contribución : **893** Tipo : **no especificado**

Measurement of the ^{239}Pu neutron capture and fission cross-section at the n_TOF time-of-flight facility at CERN

martes, 19 de noviembre de 2024 15:15 (15)

The Nuclear Energy Agency (NEA/OECD) included the improvement of the current knowledge on the cross-sections for neutron capture and neutron-induced fission of ^{239}Pu in its High Priority Request List, motivated by the growing demand for more accurate and reliable nuclear data essential for nuclear applications such as the design and operation of nuclear power plants. To address this need, a new experimental campaign has been performed at n_TOF, the time-of-flight facility of CERN, measuring ^{239}Pu for the first time at this facility. This work is part of the scientific program supported by the European Commission H2020 initiative, *Supplying Accurate Nuclear Data for energy and non-energy Applications* (SANDA).

In this experiment, ten extremely pure ^{239}Pu samples, produced at the European JRC-Geel target laboratory, with a total mass of less than 10 mg were placed in a novel ionization chamber specifically designed to handle the high counting rates caused by the α-decay of ^{239}Pu. This chamber contains fission fragment detectors, which were used in conjunction with the n_TOF Total Absorption Calorimeter, significantly reducing the γ-ray background from fission during the measurement of the capture reaction cross-section, using the so-called fission tagging technique. Additionally, a thicker ^{239}Pu sample of 100 mg was used to extend the capture cross-section measurement to neutron energies up to 10 keV.

Beyond cross-section data, this measurement will also provide valuable insights into the distribution of γ-ray cascades emitted in the ^{239}Pu(n,γ) and ^{239}Pu(n,f) reactions, as demonstrated in previous experiments with the TAC. This contribution to the XVI CPAN DAYS will describe the experimental activities performed within this work and show the latest results from the data analysis, covering a new experimental dataset for fission cross-section, from 20 meV to 20 MeV, as well as for capture at least up to 1 keV.

Abstract

Primary author(s) : SANCHEZ CABALLERO, Adrian (CIEMAT)

Co-author(s) : ALCAYNE AICUA, Victor (CIEMAT (Spain)); MENDOZA, Emilio (CIEMAT); CANO OTT, Daniel (CIEMAT)

Presenter(s) : SANCHEZ CABALLERO, Adrian (CIEMAT)

Clasificación de la sesión : Red FNUC (Red Temática de Física Nuclear)

Clasificación de temáticas : Red Temática de Física Nuclear (FNUC)