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On the corrections to the Th232(n,f) cross section measured with PPACs at n_TOF

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Recently, a renewed interested in the Th/U fuel cycle has emerged as a basis for safe and sustainable energy production, which presents the advantage, compared to the conventional U/Pu cycle presently used, of the reduced amount of produced transuranium elements. The development of fast reactors based on the Th/U cycle requires a good knowledge on the reactions involved in it, such as the neutron-induced fission of Th232. However, discrepancies exist among evaluated nuclear data libraries.

The neutron-induced fission cross section and the angular distribution of the fission fragments were measured at the CERN n_TOF facility for Th232 covering a continuous neutron energy range from threshold up to 1 GeV. For this purpose, a reaction chamber with PPAC detectors was used to detect the fission fragments in coincidence and to determine their trajectories, thanks to the stripped cathodes.

For an accurate determination of the fission cross sections, the knowledge of the angular distribution of the emitted fragments is required, since the detection efficiency of the PPACs is angle-dependent. In this work, a discussion on the corrections needed to obtain such a measurement is presented.

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