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Capture-to-fission ratio measurements at LANSCE

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Capture-to-fission cross section ratios are used as an alternative to absolute cross section measurements. This is due to the simplification on the calculations and the reduction of the uncertainties with respect to an absolute measurement of the cross section by eliminating experimental complications like self-absorption, beam/target overlap and non-uniformities. Different capture-to-fission reactions have been measured through the years at the Los Alamos Neutron Science Center (LANSCE) at Los Alamos National Laboratory (LANL) using the Detector for Advanced Neutron Capture Experiments (DANCE) combined with different fission detectors. Some of these are a Parallel Plate Avalanche Counter (PPAC) to detect fission fragments (FF), and the NEUtron detector array at dANCE (NEUANCE) to detect fission neutrons. As DANCE detects the γ-rays produced in capture and fission reactions, the fission instrument placed inside the DANCE cavity is used to tag the fission γ-rays for background identification and subtraction. Some examples of capture-to-fission ratio measurements performed with DANCE in the last years are the ^{233}U, ^{235}U and ^{239}Pu. The measurement technique, the different setups, and other potential applications of the instruments will be explained.

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