Neutron capture reactions on Lu isotopes at DANCE

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The DANCE \(^1\) (Detector for Advanced Neutron Capture Experiments) array at LANSCE spallation neutron source in Los Alamos has been used to obtain the neutron capture cross sections for \(^{175}\)Lu and \(^{176}\)Lu with neutron energies from thermal up to 100 keV. Both isotopes are of current interest for the nucleosynthesis s-process \(^2,3\). \(^{175}\)Lu is an important waiting-point in the s-process and \(^{176}\)Lu is a sensitive s-process thermometer. Three targets were used to perform these measurements. One was \(^{nat}\)Lu foil of 31 mg/cm\(^2\) and the other two were isotope-enriched targets of \(^{175}\)Lu (99.8%, 1 mg/cm\(^2\) electro-deposited on Ti) and \(^{176}\)Lu (99.9%, 1 mg/cm\(^2\) mass separator deposited on aluminized mylar). The data analysis is in progress. The cross sections will be obtained through a precise neutron flux determination, an accurate target mass measurement and the absolute calibration of the DANCE array. A comparison with the recent experimental data from K.Wisshak \textit{et al.} \(^2\) and the evaluated data of ENDF B-VII will be presented.

In addition, resonances parameters and spin assignments for some resonances will be featured.

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1 M. Heil et al., \textit{A 4}\(\pi\) BaF\(_2\) detector for (n,\(\gamma\)) cross-section measurements at a spallation neutron source, Nucl. Instr. and Meth. A 435, 528 (2004)