

Measurement of the $^{235,238}\text{U}(n, f)$ Cross-Section Relative to n-p Scattering from 10 to 70 MeV at CSNS Back-n

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Neutron-induced fission cross sections of U-235 and U-238 are ones of the most important nuclear data since they are fundamental to nuclear energy. Fission cross sections of ^{235}U and ^{238}U have been evaluated as standard data up to 200 MeV and they are always used as references for other cross section measurements. However, the experimental data in high neutron energy region are scarce. Especially above 30 MeV of neutron energy, there are only a few measurements with obvious discrepancies. Thus conducting a measurement in high energy region is quite necessary meaningful.

The back-streaming neutron facility (Back-n) at China Spallation Neutron Source (CSNS) is a newly built neutron beamline started commissioning since 2018. Back-n provides neutrons from 0.5 eV to 300 MeV with an achievable flux of 1.6×10^7 n/cm²/s at 55 meters away from the spallation target. It is therefore a good platform for nuclear data measurement. We performed an experiment at Back-n for measuring the fission cross sections of ^{235}U and ^{238}U relative to n-p elastic scattering. The ^{235}U and ^{238}U samples are sealed in an ionization chamber for measuring their fission reactions. A polythene (PE) foil and recoiling proton telescopes (RPT), consisting of silicon detectors and cesium iodide scintillators, are setup in a vacuum chamber located at the downstream of the fission chamber. The proton events are selected by the ΔE -E identification. We will firstly introduce the CSNS Back-n facility. Then we will go to details of the data analysis of fission chamber and RPT. Finally the preliminary results of fission cross section of ^{235}U and ^{238}U from 10 to 70 MeV will be shown.