MLF Experimental Report	提出日 Date of Report
課題番号 Project No. 2014A0266 実験課題名 Title of experiment ^{237}Np (n,Y) and ^{243}Am (n,Y) cross section measurement 実験責任者名 Name of principal investigator Leong Lou Sai 所属 Affiliation JAEA Nuclear science and Engineering Center, nuclear data Group	装置責任者 Name of responsible person Yosuke Toh 装置名 Name of Instrument/(BL No.) MLF/BL04 実施日 Date of Experiment 25/05-03/06 2014

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。（適宜、図表添付のこと）
Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.

A Neptunium ^{237}Np 200mg and Americium ^{243}Am 280mg
Seal inside a solid aluminum plate. 2cmΦ, 1mmt.

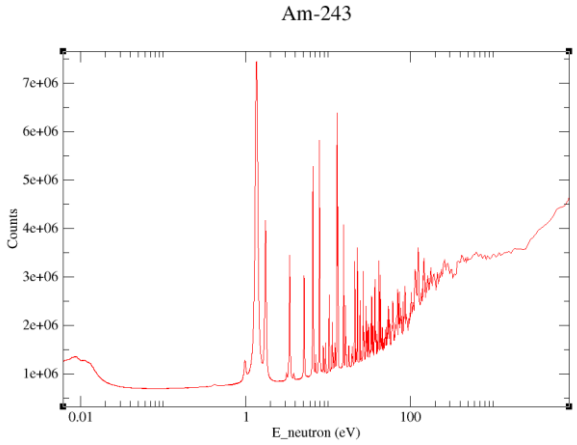
2. 実験方法及び結果（実験がうまくいかなかった場合、その理由を記述してください。）
Experimental method and results. If you failed to conduct experiment as planned, please describe reasons.

We use an array of large coverage Ge detectors for multiple gamma-ray detection, located 21.5 meter from the center of the moderator. This spectrometer consists of 22 Ge crystals and BGO anti-Compton shields. We can obtain the gamma energy spectrum and TOF spectrum simultaneously. Besides, Ge detector can achieve a very high energy resolution, giving very accurate information for the gamma, even the material impurities. The beam frequency is 25 Hz (75 shots/3s), beam power is 280 kW with using a collimator of 15 mm diameter. The targets are encapsulated into the aluminium pellet due to the radioactive security reason. In this case, it is necessary to correct the background from scattering neutrons on the pellet.
Measurement time:

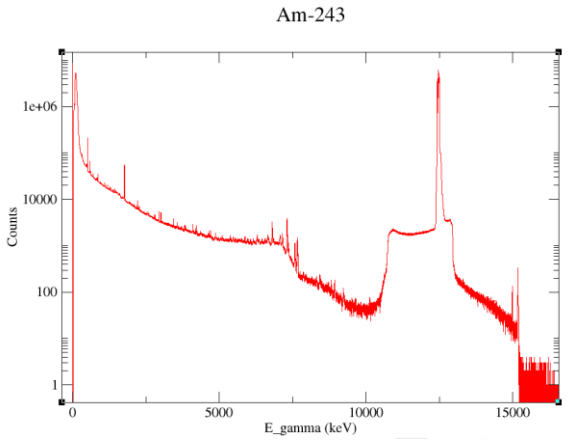
Am-243 (s)	Np-237 (s)	Lead (s)	Blank (s)	Am243dummy (s)	Np237dummy (s)
244838	258502	68534	78751	4563	15467

2. 実験方法及び結果（つづき） Experimental method and results (continued)

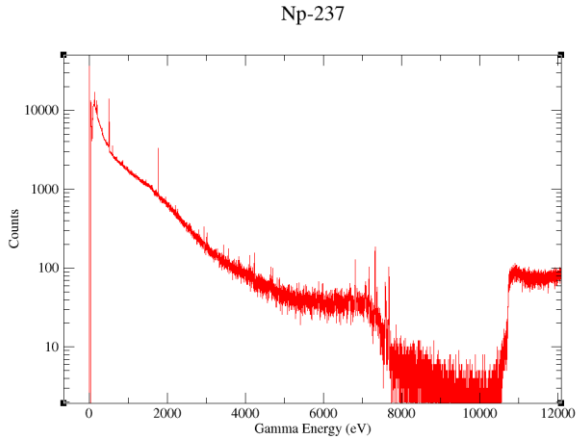
The figures represent the raw data of neutron spectrum of Am-234 (a), gamma spectrum of Am-234 (b) and Np-237 (c) respectively. We can see clearly the resonances of the data in the figure (a) and the thermal spectrum peak. The figure (b,c) shows the gamma spectrum, some of the peaks represent the impurities of the sample.



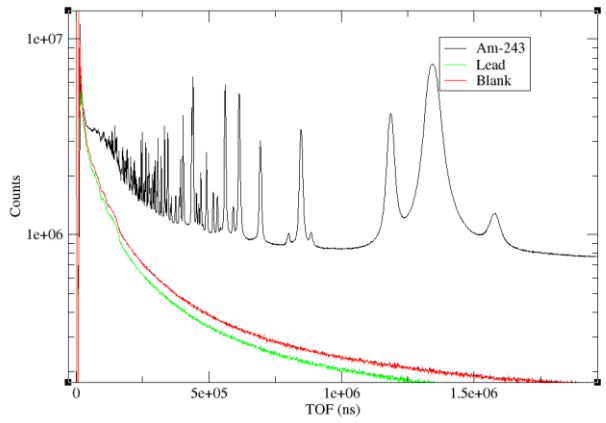
(a) Am-243 capture yield in neutron energy. The resonance of both measurements are clearly shown.



(b) Am-243 gamma spectrum



(c) Np-237 gamma spectrum.



(d) Am-234 neutron spectrum with lead capture yield (green) allows to correct the scattering neutrons and the blank capture yield (red) which allows to estimate the background.

However, to obtain the capture yields for accurate cross-section, it is necessary to perform some corrections which are mainly due to the background or the constrained measurement methods, such as the dead time, overlapped neutrons or scattering neutrons, etc... Therefore, it is important to subtract these backgrounds rigorously and the final data is planned to be shown next year.