 MLF Experimental Report	提出日 Date of Report
課題番号 Project No. 2015A0237 実験課題名 Title of experiment Fundamental study for separation and detection of muonic atom by TOF-MS technique 実験責任者名 Name of principal investigator Kazuhiko Ninomiya 所属 Affiliation Osaka University	装置責任者 Name of responsible person Miyake Yasuhiro 装置名 Name of Instrument/(BL No.) MUSE D2 実施日 Date of Experiment 2016/6/18-19

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.
PTFE foil

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.
<p>Electron arrangement of muonic Z atom is similar to that of Z-1 atom, but the detail chemical property still has not been investigated. Our final goal is investigation of chemical property of muonic atom as a new chemical species by provoking chemical reaction. For this purpose, we developed a muonic atom beam extraction system by using TOF-MS technique, and we optimized the system by using LASER ablation experiment at Osaka University. The schematic view of the experimental system was shown in Figure 1.</p> <p>In this study, we performed muon irradiation experiment for PTFE foil using this system at D2 experimental area in J-PARC/MUSE. Muon irradiation experiments were carried out with various experimental conditions; acceleration bias at electrode, incident muon momentum (muon stopping position in the sample), flight path of muonic atom, etc.</p>

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

Figure 2 shows the obtained TOF spectra in muon irradiation. In 1600–6400 ch region, we found some events of acceleration ions. This region corresponds to muonic carbon, muonic fluorine atoms. Because the statistics was poor, we are now started improvement of beam handling system for more effective detection and low background counting.

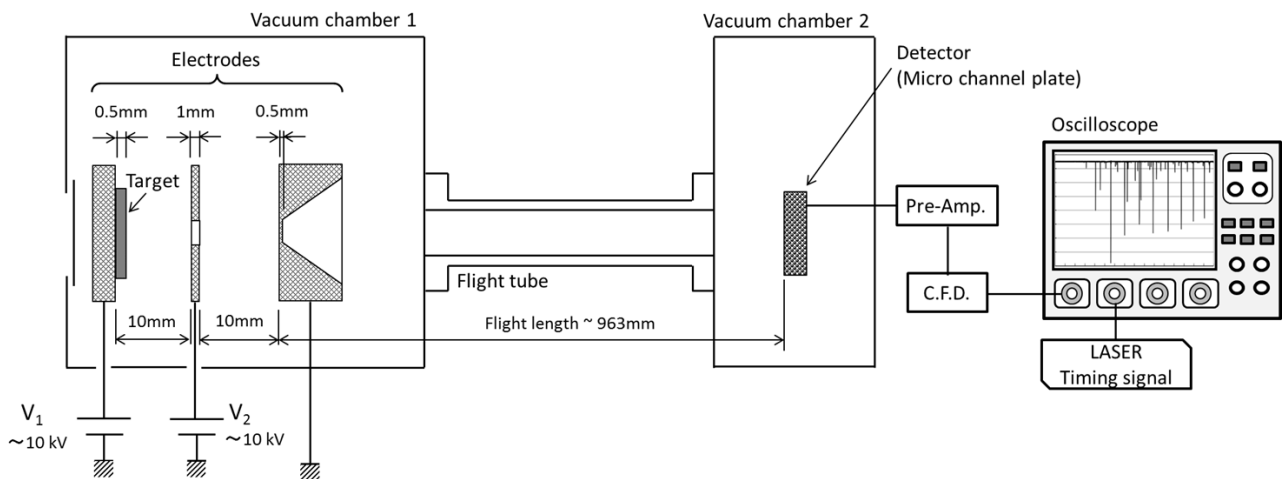


Figure 1. Experimental system of muonic atom acceleration and detection.

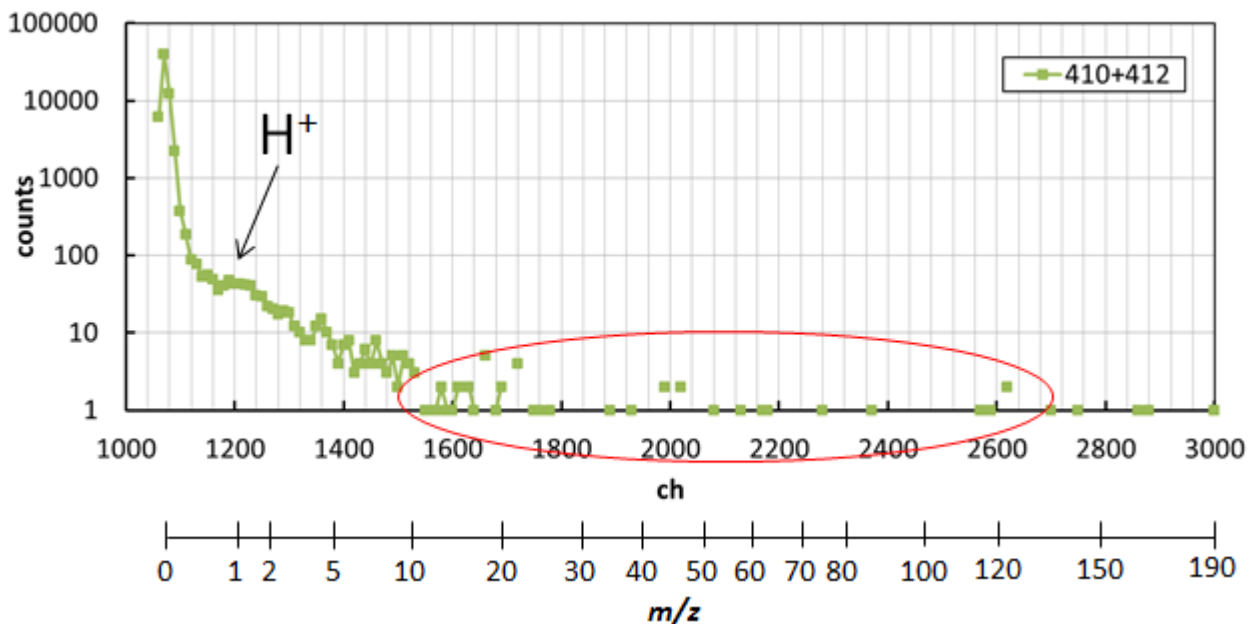


Figure 2. Preliminary results of the TOF spectrum obtained muon irradiation experiment.