STEPS Students Report

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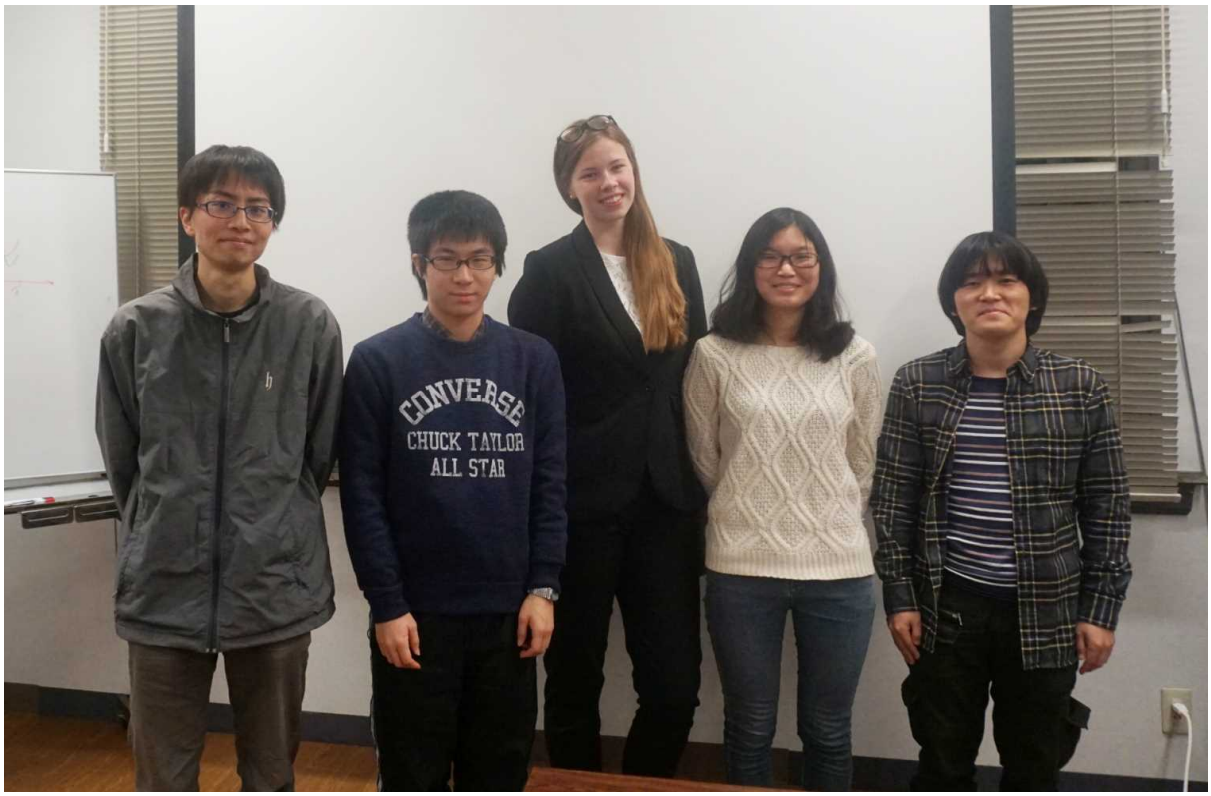
My name is Ekaterina Vedenchuk. I am an undergraduate at the Department of Chemistry of St. Petersburg State University (SPbU). Being a 4th year student I knew about STEPS from my friend who carried out a research in the University of Tokyo. According to him, the exchange program is a great opportunity to immerse oneself strictly in science within 1-3 months and look at a job of a laboratory in another group in another country, and, of course, increase the world view. And I assured myself of this fact! In Russia my investigation is a study of reverse micelles using molecular dynamics simulations. In one moment I realize that I have an idea to obtain an experience on the other hand of molecular dynamics, in particular, ultrafast molecular dynamics in intense laser fields. Therefore, I wish to express my most sincere gratitude Prof. Kaoru Yamanouchi for the opportunity to survey a new topic for me at his research group. (Pig. 1)

Pig. 1. Prof. Kaoru Yamanouchi congratulates me on STEPS Completion Ceremony

The object of my research was «Dissociative ionization of deuterium molecules in intense NIF laser fields». It was difficult to make a discovery during the month, hence the following studying objective was appropriate. I had to make sense of the carrier-envelope phase (CEP) in terms of deuterium molecules. In addition to reading articles on this subject and further data processing using specific programs for ion optic simulations and a read-out the digital data from the delay line detectors, I conducted an experiment with members of the research group that I joined (Pig.2).



Pig. 2. The friendly research group: Toshiaki Ando, Makoto Mizui, I, Qiqi Zhang, Shinichi Fukahori

In this work, the dissociative ionization of deuterium molecules was investigated. As a result of the reaction expected signals, which we could able to observe on a micro-channel plate detector, were received. These expected signals of time-of-flight (TOF) for H^+, D_2^+, D^+, HD^+ ions were also described. After some simulation for finding TOF of deuterium molecules dependence between the TOF and a z-momentum was obtained linear. The main idea of the research was to obtain a correlation between an asymmetry parameter of energy of electrons and the CEP. This point was also carried out, however, it is not quite correct. I got a lot of experience and knowledge working in the laboratory of Quantum chemistry. I would happy to return to Japan again and pursue a carrier in science.

In spite of the research, I had a good time on weekends to look at fabulous country Japan. I was glad to explore Japanese culture, tradition, and nature. For example, I enjoyed a visit the Kabukiza theatre, the Ghibli museum, a trip to Kyoto and Osaka (Pig. 3), and views of Mount Fuji, etc. I would like to thank everyone who promotes this excellent exchange program in sciences.