Contribution ID: **179** Type: **Poster**

Development of a dual isotope rubidium co-magnetometer toward electron EDM search using laser-cooled francium

Tuesday, October 18, 2016 5:57 PM (1 minute)

The permanent electric dipole moment (EDM) of an elementary particle is a good candidate to search for the physics beyond the standard model. Francium (Fr) is a radioactive heavy alkali metal and has a large enhancement factor of the electron EDM. The atomic EDM is measured by comparing the difference in the atomic resonance frequency in an external electric field parallel and anti-parallel to the applied magnetic field. Laser cooling and trapping technique has advantages over atomic beam experiment and can suppress systematic errors.

At Cyclotron and Radioisotope Center (CYRIC), Tohoku University, an experimental search for the electron EDM using laser cooled and trapped francium atoms is in progress. In the experiment, the produced francium atoms will be first trapped in a magneto-optical trap (MOT) and transferred to an optical dipole force trap where the EDM measurement will be performed.

For the sensitive EDM search, measurements of the applied magnetic field and the light shifts are required. Rubidium (Rb) has two stable, abundant isotopes. We plan to use cold Rb atoms as a co-magnetometer. The dual Rb isotope co-magnetometer can measure the magnetic field and the light shift simultaneously. This requires a dual isotope Rb MOT. For this, light sources and experimental setup for the dual isotope Rb MOT are being developed. In this presentation, the progress of the development is presented.

Author: Ms UCHIYAMA, Aiko (Tohoku University)

Co-authors: Dr KAWAMURA, Hirokazu (Tohoku University); Dr TANAKA, Kazuo (Tohoku University); Dr HARADA, Ken-ichi (Tohoku University); Mr SAKAMOTO, Kosuke (Tohoku University); Prof. ITOH, Masatoshi (Tohoku University); Ms YOSHIOKA, Risa (Tohoku University); Ms ITO, Saki (Tohoku University); Dr INOUE, Takeshi (Tohoku University); Dr DAMMALAPATI, Umakanth (Tohoku University); Prof. SAKEMI, Yasuhiro (University of Tokyo)

Presenter: Ms UCHIYAMA, Aiko (Tohoku University)

Session Classification: Poster Session