

# 38<sup>th</sup> RAP Seminar

The 38th Seminar on RIKEN Center for Advanced Photonics

Language: Japanese

Date: **Dec. 9 (Fri) 16:00 - 17:00, 2016**

Location: **Cooperation Center, 3F, W319, Wako Campus, RIKEN**

(理研 和光キャンパス 研究交流棟 3階会議室 W319)

Title: **Fundamental physics with cooled radioactive atoms**

冷却放射性同位元素で探る素粒子物理

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An Electric Dipole Moment (EDM) of the elementary particle is a good probe to observe the phenomena beyond the Standard Model of particle physics. A non-zero EDM shows the CP violation, which is one of the important signals to understand the mechanism how the matter-antimatter asymmetry has been produced in our universe. In paramagnetic atoms, an electron EDM results in an atomic EDM enhanced by the factor of the 3rd power of the charge of the nucleus due to the relativistic effect appeared in the heavy atoms. A heaviest alkali element francium (Fr), which is the radioactive atom, has the largest enhancement factor  $K \sim 895$ . At present, we are developing a high intensity laser cooled Fr factory at Cyclotron and Radioisotope Center (CYRIC), Tohoku University to perform the search for the EDM of Fr with the accuracy of  $10^{-29}$  e · cm. The laser cooling techniques are quite important to realize the high accuracy of EDM measurement by the long interaction time with the external field using optical lattice. In this seminar, the present status and future plan of laser cooled RI EDM experiments will be discussed.