

Abstract Submitted  
for the HAW14 Meeting of  
The American Physical Society

**Hyperfine structure measurement of  $^{87}\text{Rb}$  atoms injected into superfluid helium as highly energetic ion beam** KEI IMAMURA, RIKEN/Meiji Univ., TAKESHI FURUKAWA, Tokyo Metropolitan Univ., XIAOFEI YANG, RIKEN/Peking Univ., TOMOMI FUJITA, Osaka Univ., TAKASHI WAKUI, Tohoku Univ. CYRIC, YOUSUKE MITSUYA, Meiji Univ., MIKI HAYASAKA, Tokyo Gakugei Univ., YUICHI ICHIKAWA, RIKEN, ATSUSHI HATAKEYAMA, Tokyo Univ. of Agriculture and Technology, TOHRU KOBAYASHI, RIKEN, HITOSHI ODASHIMA, Meiji Univ., HIDEKI UENO, RIKEN, YUKARI MATSUO, Hosei Univ., OROCHI COLLABORATION — We have developed a new nuclear laser spectroscopy technique that is called OROCHI (Optical RI-atoms Observation in Condensed Helium as Ioncatcher). In OROCHI, highly energetic ion beam is injected into superfluid helium (He II) and is trapped as atoms. Hyperfine structure (HFS) and Zeeman splitting of trapped atoms is measured using laser-microwave (MW) / radiofrequency (RF) double resonance method. We deduce nuclear moments and spin values from the measured splittings, respectively. So far, we measured Zeeman splitting of  $^{84-87}\text{Rb}$  atoms. To evaluate the validity of the OROCHI method, it is necessary to investigate the following two points not only for Zeeman but also for HFS splittings. (i) What is the accuracy in frequency in our measurement? (ii) How high beam intensity is necessary to observe resonance spectra? For this purpose we conducted online experiment using  $^{87}\text{Rb}$  beam and measured the HFS splitting of injected  $^{87}\text{Rb}$  atoms in He II.

Kei Imamura  
RIKEN/Meiji Univ.

Date submitted: 01 Jul 2014

Electronic form version 1.4