Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Sublevel laser spectroscopy of ^{197}Au atom in superfluid helium TOMOMI FUJITA, Department Physics, Osaka University, TAKESHI FURUKAWA, Department of Physics, Tokyo Metropolitan University, KEI IMAMURA, RIKEN/Department of Physics, Meiji University, XIAOFEI YANG, School of Physics, Peking University, YOUSUKE MISUYA, Department of Physics, Meiji University, MIKI HAYASAKA, TAUBASA SAGAYAMA, SHOTA KISHI, Department of Physics, Tokyo Gakugei University, TOHRU KOBAYASHI, HIDEKI UENO, RIKEN, TADASHI SHIMODA, Department Physics, Osaka University, YUKARI MATSUO, Department of Advanced Sciences, Hosei University — We have developed a new laser spectroscopy technique named Optical Radioisotope atom Observation in Condensed Helium as Ion-catcher (OROCHI) for investigating the structure of exotic nuclei. This method is in combination with the observation of atomic Zeeman splitting (ZMS) and hyperfine splitting (HFS) in superfluid helium (He II) with laser-radio frequency/microwave double resonance spectroscopy based on the optical pumping technique We can derive nuclear spins and electromagnetic moments from atomic ZMS and HFS, respectively The characteristic optical properties of atoms in He II, caused by pressure from surrounding He atoms, enable us to apply the optical pumping technique to the various elements effectively. As for the future measurement of Au isotopes we measured the ZMS and HFS in the ground state of stable ^{197}Au atoms supplied into He II by laser sputtering technique. We succeeded in producing high atomic spin polarization (>80%) of ^{197}Au in He II with optical pumping by using the pumping laser light of fourth harmonics of a LD-pumped pulsed Nd:YLF laser.

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Date submitted: 30 Jun 2014 Electronic form version 1.4