



## Seminar 'Topological properties of superfluid $^3\text{He}$ probed by surface electron bubbles'

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Date: Th 24 Jul 2014  
Time: 14:00-15:00  
Venue: Meeting Room C016, Level C, Lab1  
Hosted by: Quantum Dynamics / Konstantinov Unit

Superfluid  $^3\text{He}$  is known as a  $p$ -wave superfluid, so that it is topological. In the A phase of superfluid  $^3\text{He}$  the scattering of quasiparticles from small object is predicted to be skew with respect to an anisotropy axis, reflecting the chiral nature [1]. In the vicinity of the specular surface of the B-phase, the Majorana states, one of the edge states of topological matters, are predicted [2].

In this talk, we present our recent transport measurement of electron bubbles trapped below the free surface of superfluid  $^3\text{He}$ . A direct experimental evidence of the chirality in superfluid  $^3\text{He}$ -A is obtained, for the first time [3]. The skew scattering of quasiparticles in  $^3\text{He}$ -A from an electron bubble resulted in a transverse transport which is analogous to the classical Hall effect, where the anisotropy vector plays a role of magnetic field. The mobility measurement in the B-phase is found consistent with the Majorana surface states [4].

[1] R. H. Salmelin, M. M. Salomaa, and V. P. Mineev: Phys. Rev. Lett. **63**, 868-871 (1989).

[2] S. B. Chung and S. C. Zhang: Phys. Rev. Lett. **103**, 235301 (2009).

[3] H. Ikegami, Y. Tsutsumi, and K. Kono: Science **341**, 59 (2013).

[4] H. Ikegami, S. B. Chung, and K. Kono: J.Phys. Soc. Jpn. **82**, 124607 (2013).