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The Effect of Quantized Vortices on Particle Motion in Superfluid Helium AKIRA HIRANO, DAIKI KATO, RYOUHEI OHTAKA, Nagoya University, AKIFUMI IWAMOTO, National Institute of Fusion Science, TAKAHIRO ITO, YOSHIYUKI TSUJI, Nagoya University, NAGOYA UNIVERSITY TEAM, NATIONAL INSTITUTE OF FUSION SCIENCE COLLABORATION — Superfluid ^{4}He (HeII) exits as liquid phase below 2.17K and indicates peculiar flow structure such as no viscosity and super heat conduction. Therefore, HeII is used as refrigerant in superconducting magnet. HeII property is well understood by so called two-fluid model that is composed of superfluid and normalfluid component. Quantized vortices are generated in superfluid component when the heat flux is larger than the critical value in a thermal counter flow. In this study, we use solid hydrogen particles as tracer and visualize tracer particle motions. The particles are forced by Stokes drag with the normalfluid and trapped by the quantized vortex with superfluid. The particle motions differ depending on the interaction between particle and quantized vortex. In order to analysis the particle trajectory, we adopt Pparticle Tracking Velocimetry. We identified two distinct types of particle trajectories moving straightly with normal fluid and moving irregularly with superfluid and apparently trapped by quantized vortex. They are compared with previous studies. The distribution of the vertical velocity component of particle motion was bimodal, which are consistent with theoretical values. We discuss in detail how the particle moves trapped by quantized vortices.

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