Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

**Molecular Dynamics Investigation of Each Bubble Behavior in Coarsening of Cavitation Bubbles in a Finite Space**[1] SHIN-ICHI TSUDA, Kyushu University, YUTA NAKANO, Graduate School of Kyushu University, SATOSHI WATANABE, Kyushu University — Recently, several studies using Molecular Dynamics (MD) simulation have been conducted for investigation of Ostwald ripening of cavitation bubbles in a finite space. The previous studies focused a characteristic length of bubbles as one of the spatially-averaged quantities, but each bubble behavior was not been investigated in detail. The objective of this study is clarification of the characteristics of each bubble behavior in Ostwald ripening, and we conducted MD simulation of a Lennard-Jones fluid in a semi-confined space. As a result, the time dependency of the characteristic length of bubbles as a spatially-averaged quantity suggested that the driving force of the Ostwald ripening is Evaporation/Condensation (EC) across liquid-vapor surface, which is the same result as the previous works. The radius change of the relatively larger bubbles also showed the same tendency to a classical EC model. However, the sufficiently smaller bubbles than the critical size, e.g., the bubbles just before collapsing, showed a different characteristic from the classical EC model. Those smaller bubbles has a tendency to be limited by mechanical non-equilibrium in which viscosity of liquid is dominant rather than by EC across liquid-vapor surface.

[1]This work was supported by JSPS KAKENHI Grant Number JP16K06085.

Shin-ichi Tsuda
Kyushu University

Date submitted: 01 Aug 2017 Electronic form version 1.4