

Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

**Numerical Study of High-Speed Droplet Impact on Wet Surfaces
and its Potential for Removing Small Particles from the Surfaces**

TOMOKI KONDO, KEITA ANDO, Department of Mechanical Engineering, Keio University
— In liquid jet cleaning, high-speed droplet impact on wet surfaces is an important phenomenon to remove small-sized contaminant particles from the surfaces. Here, we consider high-speed droplet impact on a rigid wall covered with a liquid film in order to investigate shear flow created at the wall after the impact and its role of removing small particles. We solve compressible Navier-Stokes equations with a finite volume method that is designed to capture both shocks and material interfaces in accurate and robust manners. The attached particles are assumed to be so small that the base liquid flow is undisturbed and flow around the particles is creeping; Stokes hydrodynamic force on the particles under the shear flow is evaluated in a one-way-coupling way. The particle removal is judged by a balance between the hydrodynamic force and particle adhesion of van der Waals type, with varying impact speed and film thickness.

Tomoki Kondo
Department of Mechanical Engineering, Keio University

Date submitted: 28 Jul 2016

Electronic form version 1.4