Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Disintegration of a Round Liquid Jet due to Impact on a Superhydrophobic Surface MAZIYAR JALAAL, BORIS STOEBER, Department of Mechanical Engineering, The University of British Columbia, Vancouver, BC, Canada — Liquid jet breakup has several applications such as Inkjet printers, diesel fuel injectors, and paint sprays. Very recently liquid jets have been shown to be useful for small volume transportation (*Clestini et al. Soft Matter, 2010*), where a micro-scale liquid jet on superhydrophobic surface was investigated. Although the instability of the liquid jet for some circumstances was shown, the disintegration of the liquid jet was not discussed. In the present study, we aim to analyze the breakup of a micro liquid jet due to inclined impact to a superhydrophobic surface. A range of Weber and Reynolds numbers have been explored experimentally. Water-glycerin solution as the working fluid. Generally, it is shown that the liquid jet forms a disc-like film over the surface and further rebounds ("bouncing jet"). A simple energy balance method is provided to estimate the diameter of the disc-like film. It is shown, for the case of low viscosity (large Re), this parameter is logarithmically proportional to the normal Weber number. Additionally, linear stability analysis for viscous jets provides a good estimate of droplet size. From an application point of view, using superhydrophobic surfaces 1) enables rebound of the liquid jet 2) advances the breakup point (shorten the breakup length).

Maziyar Jalaal
Department of Mechanical Engineering,
The University of British Columbia, Vancouver, BC, Canada

Date submitted: 02 Aug 2013 Electronic form version 1.4