

Abstract Submitted  
for the DFD15 Meeting of  
The American Physical Society

**A new device for generating thin jets of highly-viscous liquid<sup>1</sup>**

HAJIME ONUKI, YUTO OI, YOSHIYUKI TAGAWA, Tokyo Univ of Agri & Tech  
— Thin liquid jets are applied to various devices, such as ink-jet printers. However, it is challenging to generate liquid jets of highly-viscous liquids ( $\sim 1,000$  cSt) using existing methods. To overcome this challenge, we invent a highly-viscous liquid-jet generator. This device has simple structure as follows: a wettable-thin tube is inserted into a liquid filled container. We keep the liquid level inside a thin tube deeper than that outside of the tube. When an impulsive force acts on the bottom of the container, a thin jet is generated. The jet is up to 20 times faster than the initial velocity given by the impulsive force. We successfully generate jets with a wide range of viscosity (1-1,000 cSt). We also propose the physical model based on pressure-impulse approach to rationalize its mechanism. Inside the thin tube, a gradient of pressure impulse is much larger than that outside of the tube. We verify the performance of our device experimentally. We find that the proposed model can describe all experimental results in this research.

<sup>1</sup>JSPS KAKENHI Grant Number 26709007

Hajime Onuki  
Tokyo Univ of Agri & Tech

Date submitted: 31 Jul 2015

Electronic form version 1.4