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Hydrodynamic loading on microcantilever in liquid near a solid surface[1] SEONGHWAN KIM[2], KENNETH D. KIHM[3], The University of Tennessee — Recently, Green and Sader [J. Appl. Phys. **98**, 114913 (2005)] developed a theory predicting frequency responses of a microcantilever immersed in a fluid near a solid surface. This article presents an experimental investigation of the hydrodynamic loading effects on the frequency responses of microcantilever in liquid near a solid surface. Liquid viscosity and density are controlled by temperature change and the gap height between cantilever and a solid surface is controlled by piezoelectric actuator in atomic force microscope. It is found that the enhanced dissipative effect due to liquid viscosity near a solid surface is primarily source of hydrodynamic loading on vibrating microcantilever in liquid. The results show the physics of viscous dissipation in the micro-scale surrounding fluid and will be of value to microcantilever sensor communities.

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[2]Graduate Research Assistant
[3]Magnavox Endowed Chair Professor

Seonghwan Kim
The University of Tennessee

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