

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Unusual Behavior of a MEMS Resonator in Superfluid ^4He ¹

MIGUEL GONZALEZ, PAN ZHENG, BYOUNG HEE MOON, ERIK GARCELL, YOONSEOK LEE, Department of Physics, University of Florida, HO BUN CHAN, Department of Physics, The Hong Kong University of Science and Technology — Mechanical resonators based on micro-electro-mechanical systems (MEMS) technology were developed for the study of superfluid ^4He [1]. The MEMS device is composed of a movable plate ($200 \times 200 \mu\text{m}^2$) suspended above the substrate by four serpentine springs. The suspended plate moves parallel to the substrate while maintaining a uniform gap between them. A specific device with a $1.25 \mu\text{m}$ gap was tested in the superfluid phase of ^4He down to 100 mK. The device exhibits an extreme sensitivity to the excitation level below 400 mK, displaying a nonlinear and hysteretic behavior accompanied by switching. This phenomenon might be related to quantum turbulence generated by a rather simple oscillating plate.

[1] M. Gonzalez, B. Moon, P. Zheng, E. Garcell, H. B. Chan, and Y. Lee. *Journal of Low Temperature Physics, Online FirstTM*, 22 August 2012, DOI: 10.1007/s10909-012-0682-8.

¹This work is supported by NSF (YL) under DMR-0803516 and DMR-1205891.

Yoonseok Lee
Department of Physics, University of Florida

Date submitted: 20 Nov 2012

Electronic form version 1.4