Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Whispering-Gallery Acoustic-Sensing of Shear-forces RODOLFO FERNANDEZ RODRIGUEZ, XIAOHUA WANG, MIKE HOPKINS, KEITH PARKER, Dr. La Rosa's group, Department of Physics, Portland State University, RICHARD NORDSTROM, Department of Mechanical and Materials Engineering, Portland State University, ANDRES LA ROSA, Dr. La Rosa's group, Department of Physics, Portland State University — A novel Whispering-Gallery Acoustic Sensing (WGAS) modality has been integrated into a tuning-fork (TF) based scanning probe microscope (TF-SPM) for monitoring, via acoustic means, the distance-dependent shear-force interactions between the laterally oscillating microscope's probe and the analyzed sample. The novelty in the WGAS consist of exploiting the microscope's head-stage itself as an acoustic resonant cavity for efficiently and sensitively detecting the acoustic waves generated by the TF (in physical contact with the cavity), whose mechanical motion is modulated by the probe-sample interaction. The WGAS is able to sensitively detect the probe-sample distance dependence of the shear forces, which allows to implement an acoustic feedback control distance. Images obtained based on the WGAS mechanism will be presented.

Rodolfo Fernandez Rodriguez
Dr. La Rosa's group, Department of Physics, Portland State University

Date submitted: 14 Dec 2009 Electronic form version 1.4