

Abstract Submitted  
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**Double-Paddle Oscillators for the Mechanical Spectroscopy of Ion-Surface Modifications** D.A. FIELD, Dept. of Physics & Astronomy, Clemson University, T.H. METCALF, Naval Research Laboratory, C.E. SOSOLIK, Dept. of Physics & Astronomy, Clemson University — We discuss the use of silicon double-paddle oscillators (DPOs) as a technique for following atomistic changes in mechanical properties under energetic ion irradiation conditions in ultra high vacuum (UHV). For these DPOs, it is well known that at low temperatures ( $\sim 4\text{k}$ ) the internal friction or  $Q^{-1}$  of the anti-symmetric oscillator eigenmode is lower than  $10^{-8}$  and that it increases to  $10^{-5}$  as temperature is increased (up to  $673\text{K}$ ). This small damping or high  $Q$  allows for sensitive measurements of the mechanical properties of thin deposited films or of the oscillator structure itself. Using an incident ion beam we will investigate changes in the mechanical properties of the DPO due to mass loss during ion bombardment. In initiating these measurements, a basic frequency sweep setup has been utilized under ambient atmospheric conditions in order to finalize the required electronics and to demonstrate the various DPO eigenmodes that have been seen in earlier studies. A more advanced electronics and DPO mount design will follow as the system is transitioned to UHV operation.

Daniel Field  
Dept. of Physics & Astronomy, Clemson University

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