

Abstract Submitted
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Bulk focused ion beam fabrication of nanoelectromechanical systems WAYNE HIEBERT, DOUG VICK, National Institute for Nanotechnology, National Research Council of Canada, VINCE SAUER, Department of Electrical and Computer Engineering, University of Alberta, ALASTAIR FRASER, OLEKSIY SVITELSKIY, MARK FREEMAN, Department of Physics, University of Alberta — Focused ion beam (FIB) nanomilling of NEMS devices out of bulk material will be presented. Ion impingement from multiple directions allows sculpting with considerable 3-dimensional control of device shape, including tapering and notching. Finite element modeling of device frequencies agrees with interferometric measurements, including for the effect of a localized notch. The measurements are sensitive enough to determine the thermomechanical noise floor of a bulk FIBed NEMS device with displacement sensitivity of 166 fm per root Hz, limited only by a combination of optical shot noise and detector dark current. We envision that bulk FIB fabrication will be useful for NEMS prototyping, milling of tough-to-machine materials, and generalized nanostructure fabrication with 3-dimensional shape control.

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