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Title:	Nonlinear modal coupling in a high-stress doubly-clamped nanomechanical resonator
Authors:	Venkatesan, A. (/jspui/browse?type=author&value=Venkatesan%2C+A.)
Keywords:	Nonlinear modal high-stress doubly-clamped nanomechanical resonator
Issue Date:	2012
Publisher:	IOP Publishing and Deutsche Physikalische Gesellschaft.
Citation:	New Journal of Physics, 14
Abstract:	We present results from a study of the nonlinear inter-modal coupling between different flexural vibrational modes of a single high-stress, doubly-clamped silicon nitride nanomechanical beam. Using the magnetomotive technique and working at 100 mK we explored the nonlinear behaviour and modal couplings of the first, third and fifth modes of a 25.5 $\mu\text{m}$ long beam. We find very good agreement between our results and a simple analytical model which assumes that the different modes of the resonator are coupled to each other by displacement induced tension in the beam. The small size of our resonator leads to relatively strong nonlinear couplings, for example we find a shift of about 7 Hz in the third mode for a 1 nm displacement in the first mode and frequency shifts $\sim 20$ times larger than the linewidth (130 Hz) are readily observed.
Description:	Only IISERM authors are available in the record.
URI:	<a href="https://iopscience.iop.org/article/10.1088/1367-2630/14/11/113040">https://iopscience.iop.org/article/10.1088/1367-2630/14/11/113040</a> ( <a href="https://iopscience.iop.org/article/10.1088/1367-2630/14/11/113040">https://iopscience.iop.org/article/10.1088/1367-2630/14/11/113040</a> ) <a href="http://hdl.handle.net/123456789/3500">http://hdl.handle.net/123456789/3500</a> ( <a href="http://hdl.handle.net/123456789/3500">http://hdl.handle.net/123456789/3500</a> )
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