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**Small amplitude vibrations of curved atomic force microscope cantilevers: Theory** ARVIND NARAYANASWAMY, CARLO CANETTA, NING GU, Columbia University — The shifts in resonance frequencies of cantilevers are used to infer tip–sample interactions in tapping–mode atomic force microscopy as well as in a wide variety of cantilever based sensors. In this work, we investigate theoretically as well as experimentally the effect of curvature on the vibration dynamics of micro–cantilevers to which a micro–sphere is attached at the free end. We show that resonance frequencies of cantilevers to which a tip mass is attached can be altered by controlling the curvature of the cantilever. This control over the resonance frequency spectrum is independent of other causes of resonance frequency variation, such as adsorbed mass on cantilever or variation of material properties due to change in temperature. In the case when the cantilever is a bi–material cantilever, this shift in resonance frequency can be used as to detect changes in the thermal environment of the cantilever.

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