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Characterization of MEMS Materials

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Mechanical characterization of MEMS materials is increasingly important in view of improving reliability and assessing the life time of new devices. In this paper a number of testing methods are described. These methods include tensile, torsion and fatigue testing of specially designed microstructures, as well as wave propagation methods based on an optical pump probe setup to test thin films. Difficulties arise from manufacturing and handling of small structures and the determination of its geometrical dimensions, which directly affect the accuracy of material parameters extracted from the experiments. In addition the measurement of the mechanical parameters like small forces and torques or strains on small specimens or with ps time resolution pose challenges. This talk will focus on size effects in copper foils of thickness between 10 and 100 microns and probing of inhomogeneities caused e.g. by diffusion at interfaces in thin films.

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