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Effect of Surface Stress on the Stiffness of Cantilever Plates JOHN SADER, MICHAEL LACHUT, Department of Mathematics and Statistics, University of Melbourne — Measurements over the past 30 years have indicated that surface stress can significantly affect the stiffness of microcantilever plates. Several one-dimensional models based on beam theory have been proposed to explain this phenomenon, but are found to be in violation of Newton's third law, in spite of their good agreement with measurements. In this talk, we shall review this work and rigorously examine the effect of surface stress on the stiffness of cantilever plates using a full three-dimensional model. This study establishes the relationship between surface stress and cantilever stiffness, and in so doing elucidates its scaling behavior with cantilever dimensions. Use of short nanoscale cantilevers thus presents the most promising avenue for future investigations.

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