

Abstract Submitted
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A new thin film nanocalorimeter for measuring the heat capacity of 50nm films from 300mK to 500K.¹ DANIEL QUEEN, FRANCES HELLMAN, University of California, Berkeley — Low stress silicon nitride is used in a variety of MEMS devices as an important mechanical membrane material. The high Debye temperature of the silicon nitride makes it an ideal material for use in a MEMS based calorimeter. Microfabrication techniques provide for a high degree of reproducibility between devices on a single silicon wafer. Microcalorimeters based on low stress silicon nitride have been successfully used to measure the heat capacity of 200nm films and small single crystals (~ 50 micrograms) for over a decade. We report results on a scaled down calorimeter for measurements of 50nm thin films. By scaling down the dimensions of the device, we have reduced the background addenda by an order of magnitude as compared to previous designs. The resulting decrease in die size allows us to use the nanocalorimeter in confined spaces such as small bore magnets and beam lines.

¹A new thin film nanocalorimeter for measuring the heat capacity of 50nm films from 300mK to 500K.

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