Abstract Submitted
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Two Level Systems in Amorphous Silicon[1] DANIEL QUEEN, JULIE KAREL, University of California, Berkeley, XIAO LIU, Naval Research Laboratory, GREGORY HOHENSEE, DAVID CAHILL, University of Illinois, Urbana-Champaign, FRANCES HELLMAN, University of California, Berkeley — The specific heat of e-beam evaporated a-Si thin films prepared at various growth temperatures was measured from 2-300K. Below 20K, films with low density have a specific heat in excess of the predicted Debye value while higher density films do not. The excess heat capacity is typical of a glass with a linear contribution that is characteristic of two-level systems (TLS) and a T^3 contribution that is in excess of the Debye specific heat calculated from the measured sound velocity. The excess specific heat is independent of the elastic properties of the materials as determined by shear modulus and sound velocity measurements but depends on film density. The density dependence suggests that the low energy excitations form in voids or low density regions and are not intrinsic to the amorphous silicon network. A correlation is found between the density of TLS and the excess T^3 specific heat suggesting that they have a common origin. Comparisons will be made between the specific heat and internal friction.

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Daniel Queen
University of California, Berkeley

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