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Low temperature specific heat and Brillouin scattering in nano-oscillator arrays DOUGLAS PHOTIADIS, JOSEPH BUCARO, XIAO LIU, US Naval Research Laboratory — We consider a large, free-standing array of coupled, planar oscillators each several hundred nanometers on a side fabricated from a single layer of dielectric. In particular, we predict the low temperature heat capacity and Brillouin scattered cross section based upon a numerical calculation of the density of states (DOS) for this nano-structured array. The DOS, which is interesting in its own right, is found to have an average value nearly independent of frequency and a number of gaps of varying depths. The predictions suggest that it should be possible to use low temperature measurements of Brillouin cross section and/or the specific heat to observe the quantum statistics obeyed by various rigid body modes of the array, some of which involve the center of mass motion of a large number of atoms. As such, these measurements would result in a considerable extension of the domain in which quantum mechanics has been tested.

Douglas Photiadis
US Naval Research Laboratory

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