

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Random matrix definition of the boson peak M. LISA MANNING,
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Physics and Astronomy University of Pennsylvania — The density of vibrational
states for glasses and jammed solids exhibits universal features, including an excess
of modes above the Debye prediction known as the boson peak, located at a frequency
 ω^* . We show that the eigenvector statistics for modes in the boson peak are universal
and emerge from the interplay of disorder and global translation invariance in the
dynamical matrix. We demonstrate that a very large class of random matrices
contains a band of modes with this same universal structure, and conjecture the
existence of a new universality class. We characterize the eigenvector statistics as
a function of coordination number, and find that one member of this new class
reproduces the scaling of ω^* with coordination number that is observed near the
jamming transition.

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Date submitted: 14 Nov 2013

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