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Inferring elastic properties in colloidal solids: artifacts of a restricted observation window ASAD HASAN, CRAIG MALONEY, Carnegie Mellon University — Recently, it has been shown how to extract information about the effective elasticity in colloidal solids, granular packings, *etc.*, using two point displacement correlations as obtained in, *e.g.*, optical microscopy experiments or computer simulations. At its core, this technique relies on the observation that, within the harmonic approximation, the Hamiltonian, H, is the inverse of the elastic response function, G, *defined over the whole domain of the elastic body.* However, most experiments (and even most simulations) have access to G only over some restricted sub-domain of the experimental system. Here, we study restricted observation domains of various size and dimensionality in face centered cubic (fcc) crystals of various size using a pseudo-analytic approach in which G is obtained analytically and is inverted numerically *on a compact sub-domain* to obtain the projected Hamiltonian, $\tilde{H}$. We show that the effective plane-wave energy, $E_k = \langle\psi_k|\tilde{H}|\psi_k\rangle$, for either a [111] or [100] planar subdomain has an unusual dispersion, $E \sim k$, rather than the familiar $E \sim k^2$ and motivate this observation from continuum considerations. We also show how this leads to an anomaly in the density of states of $\tilde{H}$.

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