Abstract Submitted
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Lattice Stability and Reflection Symmetry AZITA JOVAINI, SHIGEJI FUJITA, University at Buffalo, SALVADOR GODOY, Universidad Nacional Autónoma de México, HUNG-CHEUK HO, Sincere Learning Centre, AKIRA SUZUKI, Tokyo University of Science — The basic stability condition for a general crystal lattice is the availability of parallel material planes. If this condition is met, then phonons (quanta of lattice vibrations) can be generated and can stabilize the lattice. A triclinic (TCL) lattice has three sets of material planes containing atoms subjected to restoring stresses represented by Young and rigidity moduli. Longitudinal and transverse lattice vibrations obeying one-dimensional (1D) wave equations stabilized the lattice. The phonon distribution is highly directional. There can be no spherical distribution. Earlier we show [1] that the TCL lattice has no **k**-vectors for electrons and it is is an intrinsic insulator. Consider next an orthorhombic lattice. This lattice has 3D phonons obeying a 3D wave equation with a Laplacian space-derivative. The phonon distribution is over a 3D anisotropic **k**-space. PACS numbers: 61.50.Ah, 72.15.Eb, 72.20.-i

[1] S. Fujita, A. Jovaini, S. Godoy, and A. Suzuki, *Phys. Lett. A*, **376**, 2808 (2012).

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