Abstract Submitted
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Geometro dynamics of electrons in deforming crystals LIANG DONG, QIAN NIU, Department of Physics, UT Austin — We develop a theory of electronic properties in time-dependent deforming crystals up to the first order of inhomogeneity. The difficulty with inhomogeneous system is overcome by wave-packet method, where the semi-classical equations of motion are derived including Berry phase effect. Under the local approximation, the inhomogeneous crystal is mapped to a bundle of locally periodic lattices and their connection which forms a non-Euclidean space-time for the electrons. The corresponding lattice covariant derivative takes the place of partial derivative. We discuss its physical meaning in lab frame with two examples, adiabatic current due to inhomogeneity and equivalent post-Newtonian gravity at band bottom.

Liang Dong
Department of Physics, UT Austin

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