Poincare invariance of macroscopic observables in a lattice theory[1] BEKIR BAYTAS, Beijing Normal University, EUGENIO BIANCHI, Pennsylvania State University, PIETRO DONA, Centre de Physique Theorique, Aix-Marseille University — In quantum field theory lattice discretization deforms the Poincaré algebra. In this paper we show how Poincaré invariance can be recovered by a set of generators in a definitive double-scaling limit. In particular, we introduce a set of smeared observables over mesoscopic regions as deformed Poincaré generators which form Poincaré algebra in the limit of infinite number of sites and infinite mesoscopic scale but fixed finite lattice spacing. We find that the lattice vacuum is Poincaré-smeared invariant under the transformation of the unitary operator from the deformed Poincaré generators in the double-scaling limit. The results presented demonstrate a new proposal that the Poincaré invariance is manifest on a lattice without taking the lattice spacing to zero.

Bekir Baytas
Beijing Normal University

Date submitted: 27 Jan 2020   Electronic form version 1.4