

## Abstract

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### *(De)localized Wannier functions for Chern and quantum Hall insulators*

*Joint with H. Cornean, M. Moscolari, G. Panati, A. Pisante and S. Teufel*

We consider gapped periodic quantum systems in 2- and 3-dimensions, like quantum Hall or Chern insulators, and we investigate the possibility to span the space of energy states below the spectral gap with localized Wannier functions. We show that, in presence of a non-zero Chern number, the optimal rate of decay for orthonormal Wannier functions is such that all moments of the position operators up to but not including the second are finite, and the second moment diverges. If one gives up the linear independence of Wannier functions, then we show how one can construct a Parseval frame of exponentially localized Wannier functions also in the topological phases.