Topological properties of two-dimensional dilute Shiba lattice

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We consider system of square lattice of impurities immersed in a two-dimensional *p-wave* superconductor and study its properties in the limit of Shiba states coherence length reaching impurity lattice constant. Such a system forms an exotic band structure with extremely high Chern numbers [1-3].

We develop an effective model Hamiltonian capturing essential properties of the considered system, allowing studies of topological properties of the system and its emergent structures of gap closing points in the limit of vanishing densities of the impurities. We indicate non-trivial differences in topological properties between zero-density limit of the impurities and clean *p-wave* superconductor.

[1] Joel Röntynen and Teemu Ojanen, Phys. Rev. Lett. **114**, 236803 (2015)
[2] Joel Röntynen and Teemu Ojanen, Phys. Rev. B **93**, 094521 (2016)
[3] Lukas Kimme and Timo Hyart, Phys. Rev. B **93**, 035134 (2016)