Tight-binding calculations of the orbital magnetization in chiral insulators TIMO THONHAUSER, DAVIDE CERESOLI, DAVID VANDERBILT, Department of Physics and Astronomy, Rutgers University, Piscataway, NJ 08854-8019, USA, RAFFAELE RESTA, INFM Democritos National Simulation Center and Trieste Univ., Italy — We present tight-binding calculations of the orbital magnetization in chiral insulators. Our investigations focus on two-dimensional periodic systems with broken time-reversal symmetry and zero Chern number, and on finite samples cut from such systems. Time-reversal symmetry is broken by threading magnetic fluxes through parts of the unit cell in such a way that the net magnetic field remains zero. Results for the calculated magnetization as a function of the flux show that, in the limit of large but finite systems, the orbital magnetization converges to its bulk value as computed in k-space using the formulation of the previous abstract. We also investigate the surface bandstructure, obtaining insight about the role of edge states in the circulation of the current. Possible extensions to non-zero Chern number will also be discussed.

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