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Interactions and doping effects in a topological insulator

STEPHAN RACHEL, KARYN LE HUR, Yale University, Department of Physics, New Haven, CT 06520 — We investigate the effect of repulsive and attractive onsite interactions on a Quantum Spin Hall Insulator (QSHI). For repulsive interactions, we show that the topological phase is stable up to quite large interactions $U \sim t$ before the system reaches a magnetically ordered phase [1]. For attractive interactions, we discuss superconductivity in a doped QSHI and compare it with a doped trivial band insulator. We also consider the effect of spin orbit coupling to zero-mode bound states at vortex cores.

[1] S.Rachel and K.Le Hur, Phys. Rev. B 82, 075106 (2010).

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