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Edge reconstruction in correlated quantum spin Hall insulators GIORGIO SANGIOVANNI, University of Wuerzburg (Germany), ADRIANO AMARICCI, SISSA, Trieste (Italy), JAN BUDICH, University of Gothenburg (Sweden), MASSIMO CAPONE, SISSA, Trieste (Italy), BJOERN TRAUZETTEL, University of Wuerzburg (Germany) — Symmetry-protected helical edge states live at the boundary of a topologically non-trivial quantum spin Hall insulator. We consider a repulsive local interaction on each site of a two-dimensional ribbon and study the edge states upon increasing the Hubbard-U strength.Due to its reduced coordination the surface has the tendency to become Mott insulating before the bulk. This activates a correlation-driven reconstruction mechanism in the intermediate-U regime, before the whole system has become a Mott insulator itself. We analyze this phenomenon within the Bernevig-Hughes-Zhang model, which we solve by means of Dynamical Mean Field Theory at zero temperature [1-3]. Our results hints at viewing the influence of Coulomb interaction on the helical edge states from a combined bulk-edge perspective, challanging the customary approach based on model Hamiltonians with one spatial dimension by construction.

[1] A. Amaricci, J. C. Budich, M. Capone, B. Trauzettel and G. Sangiovanni. *Phys. Rev. Lett.* **114**, 185701 (2015).
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[3] A. Amaricci, *et al.*, in preparation.

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