Cohomological Insulators A. ALEXANDRADINATA, Yale University, ZHIJUN WANG, B. ANDREI BERNEVIG, Princeton University — We present a cohomological classification of insulators, in which we extend crystal symmetries by Wilson loops. Such an extended group describes generalized symmetries that combine space-time transformations with quasimomentum translations. Our extension generalizes the construction of nonsymmorphic space groups, which extend point groups by real-space translations. Here, we *further* extend nonsymmorphic groups by reciprocal translations, thus placing real and quasimomentum space on equal footing. From a broader perspective, cohomology specifies not just the symmetry group, but also the quasimomentum manifold in which the symmetry acts – both data are needed to specify the band topology. In this sense, cohomology underlies band topology.

A. Alexandradinata
Yale University