Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Symmetry protected low energy electronic states in graphene grain boundaries MADELEINE PHILLIPS, E.J. MELE, University of Pennsylvania — We study graphene grain boundaries with the goal of predicting whether they support symmetry protected low energy electronic states localized at the boundary. Starting from a structural model for a grain boundary treated in the short range tight binding limit, we provide an algorithm for generating a chiral operator that anticommutes with the full Hamiltonian. For grain boundaries with nonbipartite lattice structures this operator is highly nonlocal. We identify two classes of grain boundaries: those that admit this chiral representation and those that do not. In the former case a zero energy electronic state is required by symmetry. We compare our results with electronic structures computed for various grain boundaries presented in the literature.

Madeleine Phillips
University of Pennsylvania

Date submitted: 14 Nov 2013 Electronic form version 1.4