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**Structure of the Surface States at Topological Insulator-Semiconductor Interfaces**[1] MAHMOUD M. ASMAR, DANIEL SHEEHY, ILYA VEKHTER, Louisiana State University — Topologically-protected surface states of three-dimensional topological insulators (TIs) are characterized by spin and momentum locking. In the simplest picture the emergent two dimensional semimetal displays opposite helicities around the point of degeneracy. Possible applications of TIs rely on forming interfaces with other materials, such as semiconductors or superconductors. In such heterostructures, the dispersion and quantum numbers of the surface states become not only dependent on bulk properties but also on the specifics of the boundaries between the TI and the material in contact. Making use of the three dimensional $k \cdot p$ Hamiltonian describing TIs, and taking in to account surface potentials compatible with the symmetries of the TI and the semiconducting material, we find the effects of the latter on the energy-momentum dispersion and spin structure of the surface state and explore the consequences this may have on physical observables.

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Asmar Mahmoud M.
Department of Physics and Astronomy Louisiana State University

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