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**Valley-Spin Polarization in the Magneto-Optical Conductivity of Silicene and Other Buckled Honeycomb Lattices** CALVIN TABERT, ELISABETH NICOL, University of Guelph — The successful isolation of graphene made the field of two-dimensional (2D) crystals a reality. Recently, increasing attention has begun to focus on other 2D honeycomb systems such as those that map onto a low-energy Kane-Mele type Hamiltonian. These systems have an intrinsic band gap due to spin-orbit coupling. One such material is silicene, the silicon equivalent of graphene. Here, the silicon atoms form a buckled honeycomb lattice. This vertical buckling creates the possibility for a tunable band gap when an electric field is applied. As the electric field is varied, the system is predicted to transition between a topological insulator and a band insulator[1,2]. We show[3,4] that when this system is subjected to a magnetic field, we retain a Landau level (LL) spectrum similar to that of gapped graphene; however, the application of an electric field spin-splits the LLs at a given valley. By varying the electric field strength, one can elucidate signatures of the two insulating regimes. It is also possible to optically excite charge carriers of definite valley-spin polarization. [1]N.D. Drummond et al., PRB 85, 075423 (2012) [2]M. Ezawa, NJP 14, 033003 (2012) [3]C.J. Tabert and E.J. Nicol, PRL 110, 197402 (2013) [4]C.J. Tabert and E.J. Nicol PRB 88, 085434 (2013)

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