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Polarization-dependent neutral atom trapping potentials of 2D optical lattices on a chip BERT DAVID COPSEY, KATHARINA GILLEN-CHRISTANDL, California Polytechnic State University, San Luis Obispo, RAJANI AYACHITULA, The Ohio State University — We present the results of our computational investigation of atom trapping potentials in different two-dimensional (2D) optical lattice geometries for neutral atoms in magnetic substates other than m_F= 0. The geometries we tested include the basic 2D optical lattice presented in [1], as well as variations of these lattices involving a counterpropagating beam pair along one dimension, and a lattice with variable trap spacing along one dimension. The 2D optical lattices are created by interference of the evanescent waves of two or more different modes in a slab waveguide. The main focus of our study is on identifying waveguide and trap light parameters that may allow for the implementation of 2-qubit gates using 2D optical lattices. 1. Phys. Rev. A 70 032302 (2004).

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