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Optical control of entangled states in semiconductor quantum wells MARIO BORUNDA, Oklahoma State University and Harvard University, ESA RASANEN, Tampere University of Technology, University of Jyvaskyla, and Haravrd University, THOMAS BLASI, Harvard University and Technisch Universitat Munchen, ERIC HELLER, Harvard University — The ability to coherently control arbitrary two-electron states, and to maximize the entanglement, opens up further perspectives in solid-state quantum information. In this talk, we present theory and calculations for coherent high-fidelity quantum control of many-particle states in semiconductor quantum wells. We have shown that coupling a two-electron double quantum dot to a terahertz optical source enables targeted excitations that are one to two orders of magnitude faster and significantly more accurate than those obtained with electric gates. The optical fields subject to realistic physical constraints are obtained through quantum optimal control theory that is applied in conjunction with the numerically exact solution of the time-dependent Schrodinger equation.

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