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Quantum optimal local control of coherent dynamics in custom-made nanostructures MARIO BORUNDA, Oklahoma State University, THOMAS BLASI, Harvard University, ESA RASANEN, Tampere University of Technology, ERIC HELLER, Harvard University — We apply quantum optimal control theory to establish a local voltage-control scheme that operates in conjunction with the numerically exact solution of the time-dependent Schrödinger equation. The scheme is demonstrated for high-fidelity coherent control of electronic charge in semiconductor double quantum dots. We find tailored gate voltages in the viable gigahertz regime that drive the system to a desired charge configuration with $> 99\%$ yield. The results could be immediately verified in experiments and would play an important role in applications towards solid-state quantum computing.

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