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**Fast** **optically-controlled**  
**two-qubit operation for cavity-coupled semiconductor quantum dots** DMITRY SOLENOV, SOPHIA E. ECONOMOU, THOMAS L. REINECKE, Naval Research Laboratory — Electron spin qubit systems based on charged InAs/GaAs quantum dots have demonstrated long coherence times and the capability of ultra fast single- and two-qubit operations in a configuration when two dots are tunnel-coupled. Designing fast two- and multi-qubit gates for spatially-separated quantum dots is currently an important challenge. We propose fast optically controlled design where a two-qubit gate is mediated by a photonic crystal cavity mode. The design addresses the challenge of scalability and does not require quantum dots to have the same energies. The proposed gate scheme is also compatible with available optically induced single qubit rotations.

Prefer Oral Session  
 Prefer Poster Session

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