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Design and fabrication of single electron spin qubits in lithographically defined silicon quantum dots

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Electron spins in Si quantum dots (QDs) provide an attractive alternative to their GaAs conterparts due to their much longer spin relaxation times[1]. We realise a pair of SOI-based double quantum dot (DQD) transistors facing each other with only a 50nm separation via E-Beam lithography and high resolution HSQ resist. A VLSI compatible fabrication process is implemented allowing for future scalability in quantum systems. We propose a new method of single electron detection verified by Monte-Carlo based simulations making use of the periodicity in the charge stability diagram of a DQD.

[1] C. B. Simmions *et al.*, *Phys. Rev. Lett.* **106**, 156804 (2011).

☐ Invited Talk
☐ Prefer Contributed Oral Presentation
☒ Prefer Poster Presentation

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Topic: Charges and spins