

Abstract Submitted
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Electrical spin injection and detection in Si¹ YONG PU, Center for Emergent Materials/Department of Physics, Ohio State University, ADRIAN SWARTZ, Department of Physics and Astronomy, University of California-Riverside, JONAS BEARDSLEY, VYDIA BHALLAMUDI, CHRIS HAMMEL, ROLAND KAWAKAMI, EZEKIEL JOHNSTON-HALPERIN, JON PELZ, Center for Emergent Materials/Department of Physics, Ohio State University — We report electrical spin injection from Fe into Si in a Fe/MgO/Si tunnel diode grown by molecular beam epitaxy. Incorporating the spin-degree of freedom into Si adds significant new functionality in a system with established utility. In addition, the use of spin as an intrinsically quantum mechanical degree of freedom may enable more speculative computing paradigms such as spin-based quantum computation. In this work, we investigate spin injection and spin detection and spin-related transport properties in Si. This work also lays the foundation for ongoing studies correlating structural, electronic and magnetic device properties with spin injection efficiency, spin transport mechanism and real-space imaging of spin transport.

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