

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Dynamic nuclear polarization in biased quantum wires using spin-orbit coupling¹ VIKRAM TRIPATHI, Tata Institute of Fundamental Research, Mumbai, ANSON C. H. CHEUNG, NIGEL R. COOPER, University of Cambridge, Cambridge, United Kingdom — We propose a new method for dynamic nuclear polarisation in a quasi one-dimensional quantum wire utilising the spin-orbit interaction, the hyperfine interaction, and a finite source-drain potential difference. In contrast with current methods, our scheme does not rely on external magnetic or optical sources which makes local control much more feasible. Using this method, a significant polarisation of a few per cent is possible in currently available InAs wires which may be detected by conductance measurements. This may prove useful for nuclear magnetic resonance studies in nanoscale systems as well as in spin-based devices where external magnetic and optical sources will not be suitable.

¹Supported by TIFR, Mumbai, Trinity College, Cambridge, and EPSRC

Vikram Tripathi
Tata Institute of Fundamental Research, Mumbai

Date submitted: 25 Dec 2007

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