

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Growth and fabrication of proximity-coupled topological quantum wire circuits from thin InAs films CAROLYN KAN, CHI XUE, YANG BAI, JAMES ECKSTEIN, Univ of Illinois - Urbana — The realization of topological states in strongly spin orbit coupled semiconductors proximity-coupled to conventional superconductors requires delicate materials engineering. Key areas for improvement include the crystalline quality of the semiconductor itself, but a high-quality interface between the semiconductor and superconductor is essential. Recent results have demonstrated the necessity of forming an in situ interface to eliminate the soft gap observed in earlier experiments. While much work has focused on vertically grown nanowires, we take a lithographic approach to fabricating quantum wires out of MBE-grown thin films, which allow for increased flexibility and scalability of device structures. Notably, our films are grown entirely in situ in linked MBE systems, vastly improving interface transmission and cleanliness. Aspects of growth architecture aimed toward increasing the InAs mobility, such as substrate choice and layer structure, are also discussed.

Carolyn Kan
Univ of Illinois - Urbana

Date submitted: 06 Nov 2015

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