

Abstract Submitted  
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**Interferometry and topological quantum computation using Majorana Fermions at semiconductor/superconductor interfaces**<sup>1</sup> JAY SAU, CMTC, Dept of Physics, University of Maryland, College Park, SUMANTA TEWARI, Dept of Physics, Clemson University, South Carolina, SANKAR DAS SARMA, CMTC, Dept of Physics, University of Maryland, College Park — Majorana Fermions are hitherto unobserved exotic Fermionic excitations, which are their own anti-particles. Recently, a lot of excitement has been generated by proposals to realize Majorana fermions in topological superconductors in a rather general class of topological superconductors, some of which may be as simple as the interface 1D or 2D InAs and Al in the appropriate parameter regime might have exotic topological properties and Majorana Fermions [1]. In my talk, I will discuss recent proposals for performing interferometry in 2D and 1D versions of such systems [2] together with ideas for performing Quantum Computation [3] using such robust Majorana fermion based qubits.

[1] J. Sau, S. Tewari, R. Lutchyn, T. Stanescu, S. Das Sarma, arxiv:1006.2829 PRB (in press). [2] J. Sau, S. Tewari, S. Das Sarma, arxiv:arXiv:1004.4702. [3] J. Sau, S. Tewari, S. Das Sarma, arxiv:arXiv:1007.4204 PRA(in press)

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Jay Sau  
CMTC, Dept of Physics, University of Maryland, College Park

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