

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Hall conductivity in the normal and topological superconducting phases of the Rashba system** SUK BUM CHUNG, Seoul National University, RAHUL ROY, University of California Los Angeles — The study of the intrinsic Hall conductivity in superconductors is attracting considerable theoretical and experimental efforts in recent years. In this paper we focus on the effect of Cooper pairing on a metallic system with non-zero intrinsic Hall conductivity - the Rashba metal with under the perpendicular Zeeman field. We find that there is a qualitatively larger change in the intrinsic Hall conductivity when there is interband pairing, with the change in magnitude linear in the pairing gap. Since the topologically non-trivial phase is unlikely to allow for significant interband pairing, our work leads to an interesting prediction : that the observation or lack thereof of the linear dependence of the intrinsic Hall conductivity on the pairing gap could be used to determine if the Rashba superconductor is topologically trivial or not. Our results are consistent with other investigations of interband pairing in the context of the proposed chiral  $p$ -wave superconducting state of  $\text{Sr}_2\text{RuO}_4$ .

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Date submitted: 14 Nov 2013

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