Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetic field induced Quasi Helical Liquid state in a disordered 1D electron system with strong spin-orbit interaction ANDERS STRÖM, University of Gothenburg, Sweden, BERND BRAUNECKER, Universidad Autónoma de Madrid, Spain, G.I. JAPARIDZE, Andronikashvili Institute of Physics, Georgia and Ilia State University, Georgia — We study the crossover from a Luttinger liquid to a quasi-helical liquid state in a one-dimensional system of interacting electrons with strong spin-orbit interaction in the presence of a transverse magnetic field, which leads to a gap for one-half of the conducting modes. In particular, we study the effect of gap opening by electron localization in the presence of non-magnetic disorder. We show that the localization length has a nonuniform behavior as a function of the magnetic field. With increasing field, the localization length grows from its zero-field Luttinger-liquid value to a maximum, after which it crosses over to again smaller values corresponding to the localization length of spinless fermions.

Anders Ström
University of Gothenburg

Date submitted: 08 Dec 2011 Electronic form version 1.4