Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

The effect of interactions on the geometrical structure of the Fermi surface in systems with spin-orbit interactions VICTOR GALITSKI, Physics Department, University of Virginia — The spectrum of many electronic systems contains band degeneracies, which can be thought of as monopoles in momentum space leading to a non-trivial topological structure of the Fermi surface. This structure is characterized by two quantities: curvature and metric, which, being gauge invariant, are in principle observable in experiment. In electronic systems with spin-orbit interactions, the Berry's curvature determines the so-called spin Hall conductivity, which may be related to observable spin accumulation near the edges. We consider Rashba, Dresselhaus, and Luttinger models and study the effect of interactions on the topology of the Fermi surface in these systems. We find that interactions renormalize the spin-orbit couplings but in certain cases do not change the Berry's phase structure. This suggests that the non-trivial geometry of the Fermi surface is a true Fermi liquid property.

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Date submitted: 29 Nov 2005 Electronic form version 1.4