Abstract Submitted
for the NWS10 Meeting of
The American Physical Society

Polarization dependence of Landau parameters for normal Fermi liquids in two-dimensions DAVID LI, ROGER ANDERSON, MICHAEL MILLER, Washington State University — Landau's formulation of his normal Fermi liquid theory was a key development in condensed matter and nuclear physics permitting one to describe the behavior and properties of a class of strongly interacting fermions with just a handful of microscopic parameters. We shall examine an application of normal Fermi liquid theory to two-dimensional fermion systems with a finite polarization. Two dimensional systems have practical importance as thin films, devices, and possibly models for certain high T_c superconductors. Two dimensions offers one important theoretical advantage: the constant density of states permits calculations to be done exactly which in three dimensions would not be possible. In a low density approach we shall calculate exact, analytic expressions to quadratic order in the s-wave and p-wave interaction parameters for the basic Landau parameters, $f^{\uparrow\uparrow}, f^{\uparrow\downarrow}, f^{\downarrow\downarrow}$. This will enable us to study the polarization dependence of the state-dependent effective masses, the spin susceptibility, the compressibility, zero sound and spin-zero sound. Application of these results is made by studying and predicting the polarization properties of thin ^{3}He films.

David Li
Washington State University

Date submitted: 24 Aug 2010 Electronic form version 1.4