Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Spin-orbit scattering in inhomogeneous superconductors CHARLES AGOSTA, DANIEL ELLOWITZ, STEVEN BUTLER, EVAN PALMER, Clark University — Spin-orbit scattering is important in all superconductors (SC) to understand the critical magnetic field. In most SC, the application of a magnetic field will eventually destroy the SC mostly due to the formation of vortices. At higher fields, when the Zeeman Energy is closer to the SC energy gap, singlet Cooper pairs are separated due to Pauli paramagnetism. One would expect that when the magnetic energy equals the SC energy gap, all SC would be destroyed, and that limit is called the Chandrasakhar-Clogston Pauli paramagnetic limit. In the case that the orbital effects can be suppressed, Pauli paramagnetism can become the dominant cause of the destruction of SC, and an inhomogeneous SC can result. An inhomogeneous SC has an order parameter with nonzero pair momentum that oscillates periodically as a function of distance, unlike traditional SC where the order parameter is uniform. Furthermore, an inhomogeneous SC can form an exotic SC state above the paramagnetic limit. We have studied a class of anisotropic organic SC that have an exotic inhomogeneous SC state. Spin-orbit scattering has a strong affect on Pauli paramagnetism and must be taken into account carefully when developing model theories. We will discuss how we extract spin-orbit scattering amplitudes from our data.

Charles Agosta
Clark University

Date submitted: 15 Nov 2013 Electronic form version 1.4