Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Thermal properties of Extreme Type-II Superconductors in High Magnetic Fields[1] JULIAN IRWIN, SASHA DUKAN, Department of Physics and Astronomy, Goucher College, MD21204 —
The subject matter of our investigation involves the complex theoretical task of calculating the specific heat of a two-gap extreme type-II superconductor. In extreme type-II superconductors, at low temperatures and high magnetic fields, Landau level quantization of electronic energies results in the appearance of gapless excitations at highly symmetrical points on the Fermi surface. The careful measurements of thermal properties like specific heat in the superconducting mixed state at low temperatures and high magnetic fields can reveal this novel gapless behavior. We present a detailed theoretical and numerical study of a realistic, disordered superconductor in high magnetic field and compare our calculated specific heat to available experimental data for the well-known two-gap superconductors $NbSe_2$ and $LuNi_2B_2C$. We also discuss the alterations to the location and number of gapless excitations caused by the inclusion of off-diagonal electronic pairing.

[1]This work is supported by NSF grant no. DMR-0856415.

Sasha Dukan
Department of Physics and Astronomy, Goucher College, MD21204

Date submitted: 10 Nov 2011 Electronic form version 1.4