

Abstract Submitted
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Undergraduate Research in Theoretical Physics at Goucher College: Thermal Properties of Extreme Type-II Superconductors in High Magnetic Fields¹ SASHA DUKAN, JULIAN IRWIN, Department of Physics and Astronomy, Goucher College, MD 21204 — The subject matter of this faculty/student collaborative research involves the complex theoretical task of calculating the thermodynamic properties of strongly coupled extreme type-II superconductors starting from the high-field limit of the Landau level pairing scheme. In these systems, the low temperature and high magnetic field regime of the phase diagram fundamentally differs from the familiar low-field mixed phase, primarily by the appearance of gapless quasiparticle excitations in the energy spectrum. This theoretical/computational research was performed over the past three years in collaboration with Goucher College undergraduate students majoring in physics, mathematics and computer science. These students used their analytical and computational skills to develop computer programs and to calculate numerically the thermal properties of realistic superconducting materials. I will describe how this project created an intellectual environment where students developed an awareness of theoretical physics research and its impact on emerging technologies as well as its possible contribution to the solutions for the global energy challenge.

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