Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Acoustic Attenuation in the Borocarbide Superconductor $LuNi_2B_2C$ in High Magnetic Fields[1] SASHA DUKAN, RUSSELL FLAUM, Goucher College — We present a detailed numerical investigation of sound wave attenuation in the borocarbide superconductor $LuNi_2B_2C$ subjected to a high magnetic field in the limit of low temperatures. At high magnetic fields, the Landau level quantization of electronic energies results in the appearance of gapless quasiparticle excitations at the Fermi surface. A powerful probe of such low-energy excitations in superconductors is measurement of the attenuation of sound waves passing through the superconductor in the limit of low frequencies. In a clean superconductor, at or near the gapless points, quasiparticles can absorb energy from ultrasonic waves and, as a result, there is an algebraic temperature dependence of the attenuation coefficient in the superconducting state. We investigate the influence of non-magnetic disorder on the attenuation coefficient and apply our theory to the borocarbide superconductor $LuNi_2B_2C$.

[1]Supported by the NSF-DMR grant # 0856415.

Sasha Dukan
Goucher College

Date submitted: 29 Nov 2009 Electronic form version 1.4