

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Determination of the Pauli Paramagnetic Limit in Quasi 2D Superconductors**<sup>1</sup> BRAUNEN E. SMITH, KYUIL CHO, WILLIAM A. CONIGLIO, CHARLES C. AGOSTA, Clark University — We have calculated the Pauli paramagnetic limit ( $H_p$ ) for different quasi 2D superconductors using a semi-empirical method. We then compared the calculated Pauli paramagnetic limits to penetration depth data obtained using a tunnel diode oscillator technique at low temperatures in a swept applied magnetic field. The organic superconductors examined are layered such that their behavior is dependent on their orientation to the applied magnetic field. In order to eliminate the effect of vortex dynamics, we examined data taken with the conducting layers oriented parallel to the applied magnetic field. For one of these materials,  $\kappa$ -(BEDT-TTF)<sub>2</sub>Cu(NCS)<sub>2</sub>, we find that eliminating vortex effects leaves us with one remaining feature in the data that may correspond to  $H_p$ . We also find that the material  $\beta''$ -(BEDT-TTF)<sub>2</sub>SF<sub>5</sub>CH<sub>2</sub>CF<sub>2</sub>SO<sub>3</sub> exhibits a change in slope for temperature versus upper critical field when the upper critical field exceeds the calculated  $H_p$ . In addition, many of the examined quasi 2D superconductors, including the above organic superconductors and CeCoIn<sub>5</sub>, exhibit upper critical fields that exceed their calculated  $H_p$  suggesting some type of non-conventional superconductivity.

<sup>1</sup>We thank the DOE BES grant #ER46214 for support.

Braunen E. Smith  
Clark University

Date submitted: 27 Nov 2007

Electronic form version 1.4