

Abstract Submitted  
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**Upper Critical Field and Phase Diagram Studies for  $\lambda$ -(BETS)<sub>2</sub>GaCl<sub>4</sub>**<sup>1</sup> LAUREL E. WINTER, WILLIAM A. CONIGLIO, KYUIL CHO, BRAUNEN E. SMITH, C.C. AGOSTA, Clark University, L.K. MONTGOMERY, Indiana University — The upper critical fields for the highly anisotropic organic superconductor  $\lambda$ -(BETS)<sub>2</sub>GaCl<sub>4</sub> have been studied by measuring the in-plane RF penetration depth with a tunnel diode oscillator technique in pulsed fields. At zero field we found a  $T_c$  of 5 K. With the field perpendicular to the conducting layers we extrapolate  $H_{c2,T=0}$  to 2.8 T and with the field parallel  $H_{c2,T=0}$  is 11 T. With the field applied parallel to the conducting layers, for  $T > 0.5T_c$  the  $H_{c2}$  follows the superconducting gap function  $\sqrt{1 - \frac{T}{T_c}}$ , then saturates below  $0.5T_c$ . Below  $0.35T_c$  we see a clear enhancement of 1.5 T in  $H_{c2}$  and in addition there is a second phase line at a lower field than  $H_{c2}$ . These features are both characteristic of the FFLO state. We will discuss this second phase line in relation to the Pauli Limit as calculated in a semi-empirical method and compare our phase diagram to previous results.

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Laurel E. Winter  
Clark University

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