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Vortex phase diagram from ^{17}O NMR study in single crystal BSCCO[1] BO CHEN, WILLIAM HALPERIN, Northwestern University — One of the most fascinating aspects of high temperature superconductors is the extreme anisotropy and the effect this has on the properties of vortices. At sufficiently high magnetic field it is expected that vortices are two dimensional and the melting transition temperature tends to a constant value, independent of field. For the most anisotropic materials such as $Bi_2Sr_2Ca_1Cu_2O_{8+\delta}$ such fields are attainable allowing almost complete decoupling of the two dimensional vortex pancakes from each other along the direction of the anisotropy axis. In our work the vortex melting phase diagram for single crystals of $Bi_2Sr_2Ca_1Cu_2O_{8+\delta}$ have been determined from ^{17}O NMR up to 22 Tesla and can be related to results at low field for the more strongly coupled three dimensional case that has been extensively studied by transport and magnetization methods. Additionally, an abrupt change in vortex structure, seemingly an order-disorder transition, was found between 5 and 8 Tesla, below 10 K.

[1]In collaboration with V.F. Mitrovic, Brown University; A.P. Reyes, P. Kuhns, W.G. Moulton, National High Magnetic Field Laboratory, Tallahassee, FL; Prasenjit Guptasarma, David Hinks, Argonne National Laboratory; and P. Sengupta, Northwestern University.

Bo Chen
Northwestern University

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