

# Peak Effect Deep in the Vortex Solid State of $\text{YBa}_2\text{Cu}_3\text{O}_{7-d}$

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## Abstract

We report on a new line in the magnetic field-temperature phase diagram of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-d}$ , characterized by the observation of a 'peak effect' deep in the vortex solid state. An important feature of this new line not predicted in any recent theories, is that it intersects the melting line well below the critical point. This feature suggests that coexistence of three different phases (liquid, ordered solid and disordered solid) occurs well below the critical point rather than at the critical point, as has been generally expected. The physical meaning of this line is inferred by examining the effect of point disorder on the different phases it separates.