

## **Vortex lock-in by columnar defects in $\text{YBa}_2\text{Cu}_3\text{O}_y$ single crystals**

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*PHYSICA C: SUPERCONDUCTIVITY 282-287 (1997) 2155-2156*

Using VSM with two perpendicular pick-up coil sets we have studied the vector magnetic moment of  $\text{YBa}_2\text{Cu}_3\text{O}_y$  single crystals with columnar defects. Completely different behavior is found for components of the magnetic moment parallel and perpendicular to the columns. Analysis shows different regions dominated by locking, trapping and matching of vortices.