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Magnetocaloric Studies of the Peak Effect in Nb¹ NIKOS DANILIDIS, IVO DIMITROV, VESNA MITROVIĆ, CHARLES ELBAUM, XINSHENG LING, Brown University — We report a magnetocaloric study of the peak effect and Bragg glass transition in a Nb single crystal. The thermomagnetic effects due to vortex flow into and out of the sample are measured. The magnetocaloric signature of the peak effect anomaly is identified. It is found that the peak effect disappears in magnetocaloric measurements at fields significantly higher than those reported in previous ac-susceptometry measurements. Investigation of the superconducting to normal transition reveals that the disappearance of the bulk peak effect is related to inhomogeneity broadening of the superconducting transition. The emerging picture also explains the concurrent disappearance of the peak effect and surface superconductivity, which was reported previously in the sample under investigation. Based on our findings we discuss the possibilities of multicriticality associated with the disappearance of the peak effect.

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