The critical state in type–II superconductors with cross–flow effects

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In this contribution we will reviev some impact experiments of magnetic hysteresis in type–II superconductors with cross–flow effects. It is shown that critical state pronciples, in the manner introduced by C.P.Bean for parallel vortex lattices, may be used to describe the observed behavior. We shall present a least action principle which allows a variational interpretation of the critical state. The coarse–grained electrodynamic response of the superconductor is solved by minimizing the magnetic field changes, for a current density vector constrained to belong to some bounded set. The selection of this set determines the specific critical state model in use. Recent magnetization experiments of high–temperature superconductors, which have been devised for discriminating if favour of one model or another will be discussed within the framework of our theory.