Flux dynamics in a two-band superconductor with delocalized electric fields\textsuperscript{1} MILIND N. KUNCHUR, JAMES KNIGHT, Dept. of Physics & Astronomy, University of South Carolina — In conventional flux flow, vortex dissipation is localized to the vicinity of the vortex core leading to a viscous coefficient $\eta$ that is independent of flux density $B$ and a flux-flow resistance $R_f \propto B$. This causes a progressive broadening with $B$ of $I$-$V$ and $R$-$T$ curves, which in turn degrades a superconductor’s performance in switching applications. An anomalous behavior arises when a substantial quasiparticle population exists away from the cores and when the electric field and dissipation extend into those regions—a scenario that is realized in a disordered two-band superconductor with slow branch-imbalance relaxation. In this case $\eta$ rises linearly with $B$ and $R_f$ becomes independent of $B$, as observed in disordered magnesium diboride. Such an intrinsically field indifferent mixed-state response makes this system especially suited for magnetic-field induced switching.

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