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Free flux flow in two single crystals of V_3Si with differing pinning strengths[1] O. GAFAROV, A.A. GAPUD, S. MORAES, University of South Alabama, J.R. THOMPSON, University of Tennessee Knoxville, D.K. CHRISTEN, Oak Ridge National Laboratory, A.P. REYES, National High Magnetic Field Laboratory — Results of measurements on two very clean, single-crystal samples of the A15 superconductor V_3Si are presented. Magnetization and transport data have confirmed the "clean" quality of both samples, as manifested by: (i) high residual electrical resistivity ratio, (ii) very low critical current densities Jc, and (iii) a "peak" effect in the field dependence of critical current. The (H,T) phase line for this peak effect is shifted down for the slightly "dirtier" sample, which consequently also has higher critical current density J_c(H). Large Lorentz forces are applied on mixed-state vortices via large currents, in order to induce the highly ordered free flux flow (FFF) phase, using experimental methods developed previously. The traditional model by Bardeen and Stephen (BS) predicts a simple field dependence of flux flow resistivity $\rho_f(H) \sim H/H_{c2}$, presuming a field-independent flux core size. A model by Kogan and Zelezhina (KZ) takes into account the effects of magnetic field on core size, and predict a clear deviation from the linear BS dependence. In this study, ρ_f(H) is confirmed to be consistent with predictions of KZ.

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