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High-current hunt for Bardeen-Stephen flux motion in A15 superconductor V_3Si at high fields RAJENDRA KHADKA, ALBERT GAPUD, University of South Alabama, LLOYD LUMATA, ARNEIL REYES, PHILIP KUHNS, National High Magnetic Field Laboratory, DAVID CHRISTEN, Oak Ridge National Laboratory — The motion of *flux lines* – quantized supercurrent vortices – is observed in a high-quality superconducting single crystal of V_3Si with very little flux "pinning". Consequently flux lines are more free to move under a Lorentz force when a transport current is applied. This opens up the possibility of Bardeen-Stephen flux flow (BSFF), wherein flux lines move in an orderly fashion. BSFF is clearly recognizable by a linear dependence of its dissipation resistivity on applied field H and can be observed in voltage vs. current (VI) curves. Since this requires both pinning-free samples and currents in the tens to hundreds of amperes, BSFF is difficult to attain especially because of current-induced heating. In this study, heating is significantly reduced via ultrasonically soldered contacts, pulsed currents, and submerging the sample in liquid helium. Measuring from fields of 6 T up to 20 T, dissipation levels characteristic of ordered flux flow are clearly distinguishable, along with other interesting features such as the "peak" effect in critical current $J_c(H)$ seen only when pinning energy density is comparable to the elasticity of the flux medium. The data and their interesting ramifications will be discussed.

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