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Comparative study of flux creep in superconductors over a broad spectrum of pinning properties[1] LEONARDO CIVALE, SCOTT BAILY, BORIS MAIOROV, Superconductivity Technology Center, Los Alamos National Laboratory — Thermal fluctuations are responsible for the phenomenon of flux creep in type-II superconductors, which allows some level of vortex motion even when the current density is below the critical current density (J_c). Creep studies in the high temperature oxide superconductors (HTS) have been a topic of continuous attention since the discovery of these materials. The topic is of both fundamental interest, as HTS vortex matter exhibits a rich variety of dynamic regimes, and practical relevance, as creep reduces the"effective" J_c in wires that are used for power applications. To gain a more general understanding of creep phenomena we have performed comparative studies of the time relaxation of the "persistent" superconducting current, $J(t)$, in a variety of type-II superconductors. The $J(t)$ was determined from magnetization (via the critical state model) using a SQUID magnetometer. The materials studied include thin films and single crystals of HTS, pnictides, MgB_2 and conventional low T_c superconductors. This allows the spanning of several orders of magnitude in J_c, in the fraction J_c/J_0, where J_0 is the depairing current density, and in the Ginzburg number (G_i), which measures the importance of thermal fluctuations. I will discuss the evidence for glassy or non-glassy relaxation in the various systems.

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