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Vortex phases and dynamics in $YBa_2Cu_3O_7$+$BaZrO_3$ films as a function of angle and field up to 50 Tesla S.A. BAILY, B. MAIOROV, H. ZHOU, S.R. FOLTYN, T.G. HOLESINGER, Q.X. JIA, LEONARDO CIVALE, Superconductivity Technology Center, LANL, Los Alamos, NM, F.F. BALAKIREV, M. JAIME, National High Magnetic Field Laboratory, LANL, Los Alamos, NM — Studying the vortex solid-liquid transition (resistivity=0) in high T_c superconductors is scientifically and technologically relevant. We have used low current transport measurements to study the melting line of $YBa_2Cu_3O_7$ films with and without $BaZrO_3$ additions in fields up to 50 T. Samples with mostly extended particle defects, mostly columnar defects, or a mixture of both will be compared. Plain $YBa_2Cu_3O_7$ shows correlated pinning along the crystalline axes and the emergence of a smectic phase when field is aligned with the a-b plane. Inclusion of $BaZrO_3$ not only alters the angular dependence of the irreversibility line indicating the stronger influence of c-axis correlated pinning, but also affects dissipation in the vortex-liquid state over the entire angular range. We will discuss the results in terms of vortex pinning, the corresponding types of phase transitions, micro-structural analysis, and information obtained from critical current measurements.

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