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Evolution of the vortex-solid to vortex-liquid melting line in $Y_{1-x}Pr_xBa_2Cu_3O_{6.96}$ and $YBa_2Cu_3O_{6.5}$ to 45 tesla B.J. TAYLOR, M.B. MAPLE, University of California, San Diego — By extending magneto-transport measurements to fields up to 45 tesla, we have been able to examine the vortex glass melting line of $Y_{1-x}Pr_xBa_2Cu_3O_{6.96}$ (x = 0 - 0.4) thin film samples and that of an oxygen deficient $YBa_2Cu_3O_{6.5}$ single crystal over an extended temperature range, $0.03\ T_c \leq T \leq T_c$, larger than heretofore reported. The melting lines are analyzed in the context of the model of Blatter & Ivlev (BI) [PRL **70**, 2621 (1993)] with temperature dependent parameters, ξ, λ, etc. The temperature dependence of the relaxation time of a single vortex flux line, displaced by quantum/thermal fluctuations, is deduced such that the *entire* melting line of each sample can be fit to smoothly by the modified expression of BI, implying that the physical mechanism responsible for the manner and conditions of the melting of the vortex solid can be described smoothly over the entire temperature − field range. This research was sponsored by the DOE under Research Grant No. DE-FG02-04ER46105. A portion of this work was performed at the National High Magnetic Field Laboratory, which is supported by NSF Cooperative Agreement No. DMR-0084173, by the State of Florida, and by the DOE.

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