

Stability and Quench Behavior of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ Coated Conductor at 4.2 K Self-Field

H. Song (ASC/NHMFL, EE/COE, FSU), J. Schwartz (ASC/NHMFL, ME/COE, FSU)

The stability and quench behavior of YBCO CC at 4.2 K, self-field, has been investigated over a range of transport current. The conductor is very stable and has very slow NZPV. Due to the temperature gradient along the conductor length and normal to the surface, the onset of a measurably non-zero voltage occurs before the surface temperature reaches the current-sharing temperature. This may have implications for the development of quench protection in YBCO magnets.

The MQE of YBCO CC at 4.2 K is approximately three orders of magnitude greater than that of LTS conductors, and, for the parameter ranges studied here, significantly more stable than MgB₂. Compared to Bi2212, the fundamental behavior is very similar and the stability and quench behavior is, thus, driven by the specifics of the conductor geometry, and in particular the conductor I_c .

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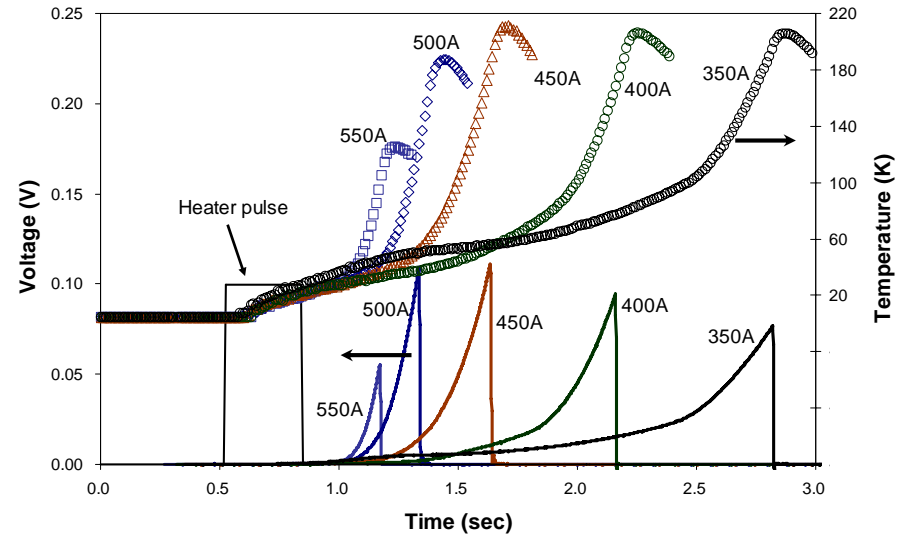


Figure 1 $V(t)$ and $T(t)$ as a function of transport current during quenches induced with quench energy slightly greater than the respective MQE.

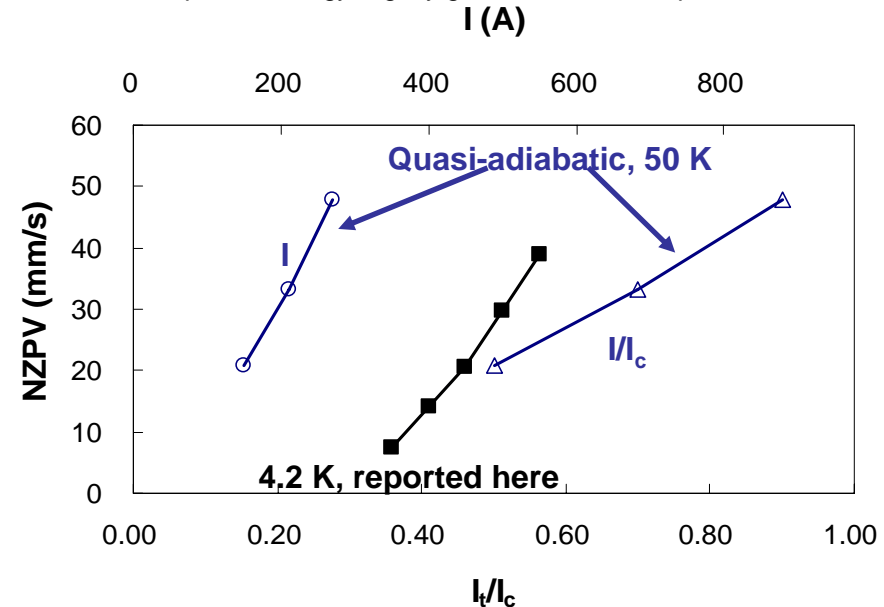


Figure 2 NZPV comparison between 4.2 K and adiabatic condition.