

Quench Development at Supercritical Currents in Low n-Value Superconductors

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Abstract—Superconducting magnets consisting of conductor having a low n-value can be operated shortly with overcritical currents without quenching the magnet. This applies also to epoxy-impregnated coils. However, when sufficiently high disturbance occurs at a supercritical current a magnet quenches. Traditional approaches on minimum quench energy (MQE) do not consider the supercritical region. In this study we measured MQE at sub- and super critical currents for MgB₂ and Bi-2223/Ag conductors having low n-values, i.e. below 15. A Finite Element Method model was compared with the measurement results and the differences in MQE between the sub- and supercritical regime were scrutinized.

Index Terms—MgB₂, Bi-2223/Ag, HTS, stability, quench, measurements

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