Self-Field Instabilities in High-J_c Nb_3Sn Strands: The Effect of Copper RRR

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Recently it has been shown that at 1.9 K the self field instability is the dominating mechanism that limits the performance of high-J_c Nb_3Sn strands with a low (<10) Residual Resistivity Ratio (*RRR*) of the stabilizing copper [1]. At CERN several state of the art Rod Re-Stack Process (*RRP*) and Powder In Tube (*PIT*) Nb_3Sn strands have been tested at 4.2 K and 1.9 K to study the effects on self field stability of: *RRR*, copper to non-copper ratio, strand diameter and, stycast interposed between the strand sample and the helium bath. The experimental results are discussed and compared with models developed to simulate magneto-thermal instabilities.

[1] B. Bordini, E. Barzi, S. Feher, L.Rossi, A.V. Zlobin, "Self-Field Effects in Magneto-Thermal Instabilities for Nb-Sn Strands", to be published in *IEEE Trans. Appl. Supercond*. 2008