# Characterization of High $J_c$ $Nb_3Sn$ Strands for the Series-Connected Hybrid Magnet

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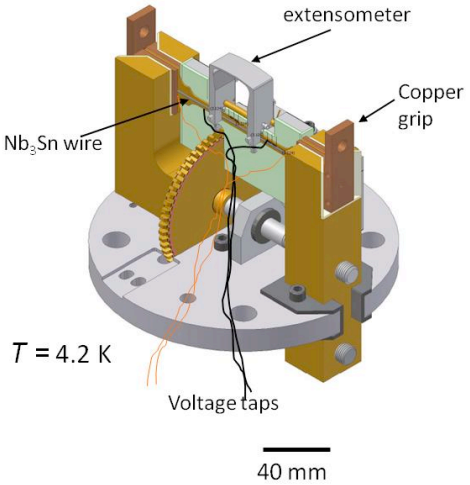
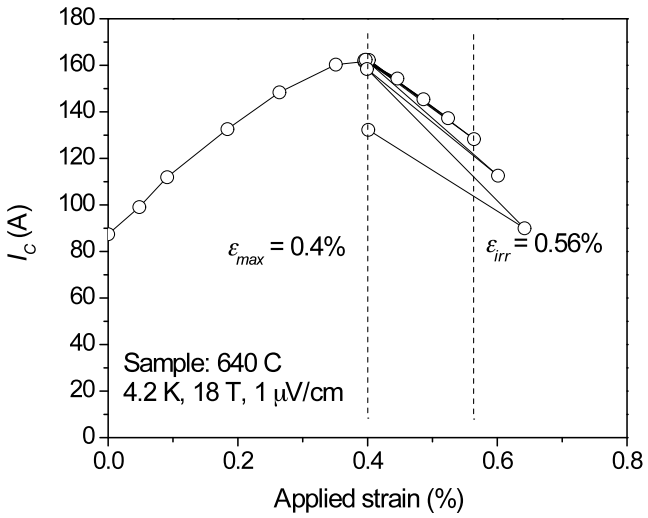
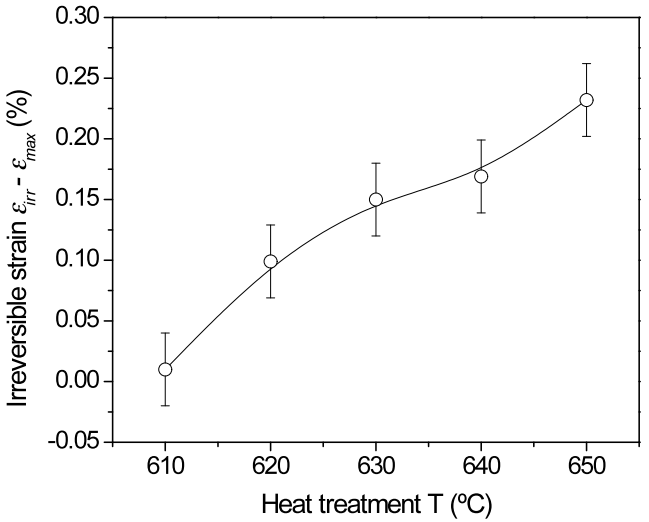
Characterization of critical properties of $Nb_3Sn$ wires used in the SCH is crucial to both the magnet design and quality assurance of procured wires. In particular, the critical current $I_c$ of the $Nb_3Sn$ is very sensitive to thermal and electromagnetic strain.




We use a home-built unique apparatus to accurately measure $Nb_3Sn$ wire $I_c$ versus strain taking advantage of a large bore high field magnet at the NHMFL. The irreversible strain limit $\varepsilon_{irr}$, above which $Nb_3Sn$ wire is permanently damaged, is an indicator of wire strain tolerance. We measured $\varepsilon_{irr}$ of $Nb_3Sn$ wires heat treated at different temperatures. We found that $\varepsilon_{irr}$ increases with heat treatment temperature. This is the first experiment on heat treatment temperature dependence of $\varepsilon_{irr}$. This finding made significant contribution to the understanding of $I_c$ strain behavior of $Nb_3Sn$ wires.

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