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**Advances in low-loss NbTi strand and cable**

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*Abstract:*

Losses in superconducting cables fall into three main categories: hysteresis loss within the filaments, coupling between filaments within the wires and coupling between wires within the cable. If they are kept down to reasonable levels, these losses are approximately independent and additive. Hysteresis loss is reduced by fine subdivision of the filaments, but proximity coupling becomes a significant problem for filament diameters of less than  $\sim 4\mu\text{m}$ . It must be controlled by ferromagnetic additions to the matrix metal. Coupling between filaments within the wire may be controlled by twisting as tightly as possible and by increasing the transverse resistivity with resistive barriers. Design of these barriers is trade-off between the conflicting needs of resistivity, stability and fabricability. In the cable, coupling between strands may be reduced by increasing the resistance between strands. Creative chemistry allows one to achieve very high resistances but there are signs that this may reduce stability by making it harder for non-uniform current distributions to equalize between the strands.