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Mitigation of Performance-Limiting Mechanisms in Nb₃Sn SRF Films

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Low BCS surface resistance and large superheating field make Nb₃Sn a very attractive material for low-field SRF applications. At the same time, the performance of Nb₃Sn at high RF fields can be limited by current-blocking grain boundaries, small lower critical magnetic field, poor thermal conductivity and high resistivity, which make Nb₃Sn prone to premature penetration of vortices and overheating effects. In this talk I discuss possible ways by which the performance-limiting mechanisms in Nb₃Sn could be mitigated by surface nanostructuring and improving current transparency of grain boundaries. I will also discuss nonlinear SRF losses caused by trapped vortices.

Primary author: Dr GUREVICH, Alex (Old Dominion University)

Presenter: Dr GUREVICH, Alex (Old Dominion University)

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