

Dissipation caused by oscillating vortices in the SRF cavities

Friday 9 November 2018 11:00 (25 minutes)

In this talk I discuss the RF dissipation of trapped vortices which contribute to the residual surface resistance in SRF cavities. In particular, the power caused by oscillations of flexible pinned vortex segments driven by a weak RF field, and the dependencies of the RF power on frequency, spatial distribution of pinning centers and purity of the material are considered. A brief overview of the vortex viscous drag is given, starting from the conventional Bardeen-Stephen model and its generalizations including the effect of the De-Gennes energy levels in the vortex core and the nonmagnetic impurity scattering. A nonlinear vortex viscosity at strong RF current drives, terminal velocities of vortices penetrating the cavities at the RF fields close to the superheating field, and the extent to which pinning can mitigate the RF vortex dissipation are discussed.

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