

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Characterization of Phase-Slip Centers created in superconducting $\text{Nb}_x\text{Ti}_{1-x}\text{N}$ thin films close to T_c ¹ KHALIL HARRABI, Physics Department KFUPM, Dhahran Saudi Arabia, JEAN PAUL MANEVAL, Physics Department ENS Paris, France, MANEVAL COLLABORATION — The dissipative states induced by an over-critical (pair-breaking) current in superconducting $\text{Nb}_x\text{Ti}_{1-x}\text{N}$ strips were investigated and characterized in the vicinity of the critical temperature T_c (~ 8.7 K). The suppression of superconductivity then occurs locally and leads to the creation of a phase-slip center (PSC). In the case where the over-critical current is applied as a step pulse, the PSC voltage rise is preceded by a nucleation time t_d which can be analyzed through a Time-Dependent Ginzburg-Landau theory due to Tinkham. In conformity with previous work, we interpret the effective gap relaxation time of the theory as the film cooling time. By consideration of the respective weights of the electron and phonon specific heats, the phonon escape time can be derived from experiments. It is here found to be 1.8 ns for a 20 nm NbTiN film sputtered on polished crystalline Al_2O_3

¹King Fahd University of Petroleum and Minerals Saudi Arabia

Khalil Harrabi
KFUPM

Date submitted: 06 Dec 2016

Electronic form version 1.4