



A BEAM LINE HOM ABSORBER FOR THE EUROPEAN XFEL LINAC

N. Mildner, M. Dohlus, J. Sekutowicz, K. Zapfe
DESY, Notkestrasse 85, 22607 Hamburg, Germany

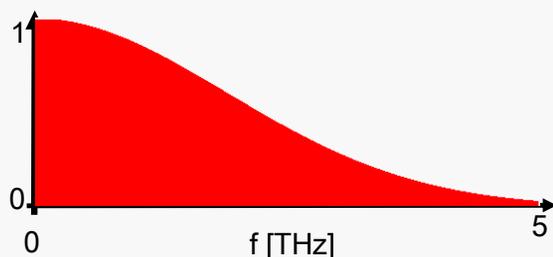
High frequency Higher Order Modes propagating in the beam line of a superconducting linac carry big fraction of the energy deposited by an accelerated beam. In this contribution we describe the design of beam line absorbers which we plan to install between cryomodules to dissipate the propagating energy in 70 K environment. Experiments with absorbing material and mechanical and thermal modeling of the absorber are presented in the paper

Nominal Beam Spectrum

Bunch: $\sigma_z = 25 \mu\text{m}$ (rms) @ 1 nC @ $t_b = 200 \text{ ns}$

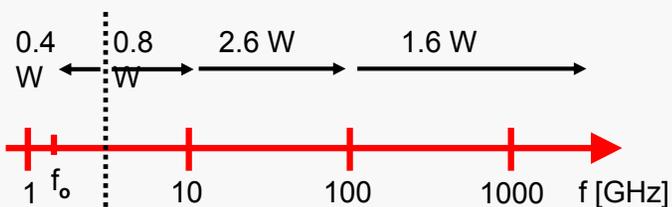
Spectral lines separation: $\Delta f_{i,i+1} = 5 \text{ MHz}$

RF pulse repetition frequency: 10 Hz



HOM power deposited by the nominal beam

5.4 W/(8-cavity cryomodule, $k_{||} = 135 \text{ V/pC}$)

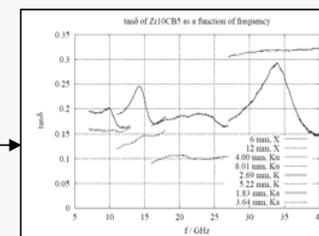
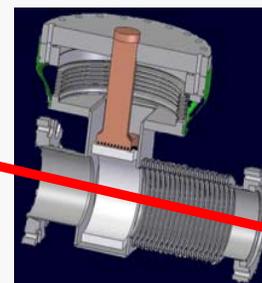
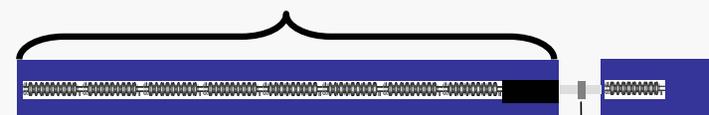


Cut-off Propagation

HOM coupler Beam Line Absorber

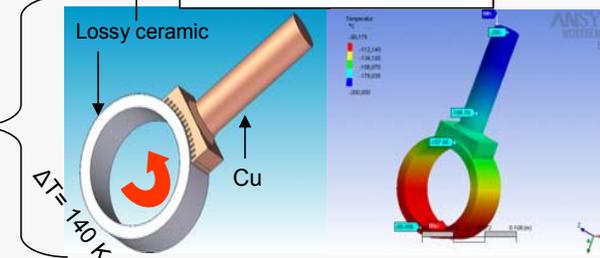
70 K Beam Line Absorber

12 m long cryomodule: 8 cavities



Performed tests:

- ✓ 3x fast cool-down to 70 K
- ✓ 140 k ΔT across the ceramic and stub
- ✓ several times cool-down to 4K



- Prototype ready in October 2005
- Beam Test in TTF 2006: expected absorption ~80%
- Design capability up to 100 W (cw- or near-cw operation)