

Workshop on
HOM Measurements
of Higher Order Modes
in Superconducting
Accelerating Cavities

January 22-23, 2007
DESY, Hamburg,
Bld. 24, room 200

Wakefields in Superconducting Cavities

- **Superconducting Cavities**
 - more and more used in various projects: linear collider, FELs, ERLs
- **Many common issues related to wakefields**
 - e.g. transverse emittance increase, beam break-up, beam loading
 - short range wakes: single bunch effects
 - long range wakes: long bunch effects
 - usually one studies the component Higher Order Modes
 - dipole modes are often the highest concern

Wakefield Studies

- **Purpose of Wakefield Studies :**

- reduce wakefield effect on the beam
- use HOMs for diagnostics

- **Methods:**

- Theoretical calculations and modeling
- EM field simulations
 - codes like MAFIA, MWS, HFSS, URMEL etc.
- Measurements in the RF laboratory
 - on model cavities (e.g. Cu) or real cavities
 - bead-pull, wire method etc.
- Studies with beam
 - study excitation of wakefields by the beam and its effect on the beam

Wakefield Studies with Beam

- **Various studies in TESLA cavities at TTF/FLASH**
 - find high-impedance modes with modulated beam
 - active HOM excitation through the HOM couplers
 - studies on single bunch wakes and coupler kicks
 - use the HOM signals for beam position and phase monitoring, and feedbacks
 - get information on cavity geometry by comparing various modes and cavities
- part of the beam time is foreseen for studies for the ILC and the XFEL

Purpose of this Workshop

- Discuss measurements with beam in conjunction with theory/simulations/test bench measurements
 - not restricted to HOMs: long-range wakes, coupler kicks etc.
- Bring together people from various laboratories / with various experience / theorists and experimentalists
- Identify common issues and ideas for future studies

Workshop Program

- 3 main parts in the program:
 - past and present studies
 - with beam and also in the RF lab
 - theory/calculations/simulations
 - ideas for the future