

# HOM Workshop - Concluding Discussion

## Issues related to wakefields in SC cavities

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- Short range

- cavity wakefields
- coupler wakes (stronger on-axis than 4mm off-axis wakes)
- coupler kicks and surface fields (peak current boundary)
- some measurements in the past; need further studies

- Long-range

- wakefields
- coupler kicks
- mode damping:
  - angle of couplers (around self-axis) changed for newer TESLA cavities at DESY, in order to insure damping

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- Long-range (cont.)

- polarization planes

- rotation of planes determines kicks in other plane

- polarization - what determines it

- simulations AND measurements are needed
- some measurements made by V. Kalyuzhnii
  - DESY-TESLA-2002-12
- systematic study (at FLASH) needed: compare cavities, modes etc.

- polarization type (linear/circular/elliptical?; 90deg?)

- simulations predict rotation of dipole modes along cavity
- experimental studies are planned at FLASH
  - first data has been taken last week and need to be analyzed
- RF bead-pull measurements
  - some made by Ken Watanabe (KEK)
  - to be done very carefully due to temperature changes
  - vary angle of couplers on model cavity

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- Long-range (cont. 2)

- mode properties vs. cavity geometry
  - frequency splitting, damping, polarization
  - idea: cell-to-cell geometry study by study of a full passband
- modes above the cut-off frequency
- trapped modes
  - addressed by past measurements
- breakdown with large frequency splitting?
  
- measure the internal cavity profile ?

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- **Diagnostics**

- **HOM-BPMs:**

- already integrated with control system
- should improve speed with better CPU
- multi-bunch: limited to ~100 bunches (@ 1MHz)
- improve digitizers → FPGAs

- **Phase measurement wrt RF**

- single pulse, single bunch measurement
- 0.08% precision observed with scope based setup
- is this needed?

- **Cavity alignment measurement in cryo-module**

- has been made with one mode only so far
- to be done with various modes
- agreement to wire-system?

# HOM Workshop - Concluding Discussion Facilities

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- **FLASH, DESY, Hamburg**
  - now mainly user facility
  - 2-3 accelerator study periods per year (3-4 weeks each)
  - the following period in August?
- **ERLP, Daresbury Lab**
  - 4 TESLA cavities in two cryo-modules (booster and linac)
  - beam foreseen for June
  - test facility for (at least) 2-3 years
  - 7-cell cavity will be installed
- **FEL at ELBE, Rossendorf Inst.**
  - studies planned on 26-29 Feb, 2007, by C. Beard (Daresbury Lab)
  - user facility  $\Rightarrow$  limited availability for studies
- **Module test facilities for the ILC? (Fermilab, KEK)**
  - plan to have beam at Fermilab