Projects for ILC-XFEL synergy

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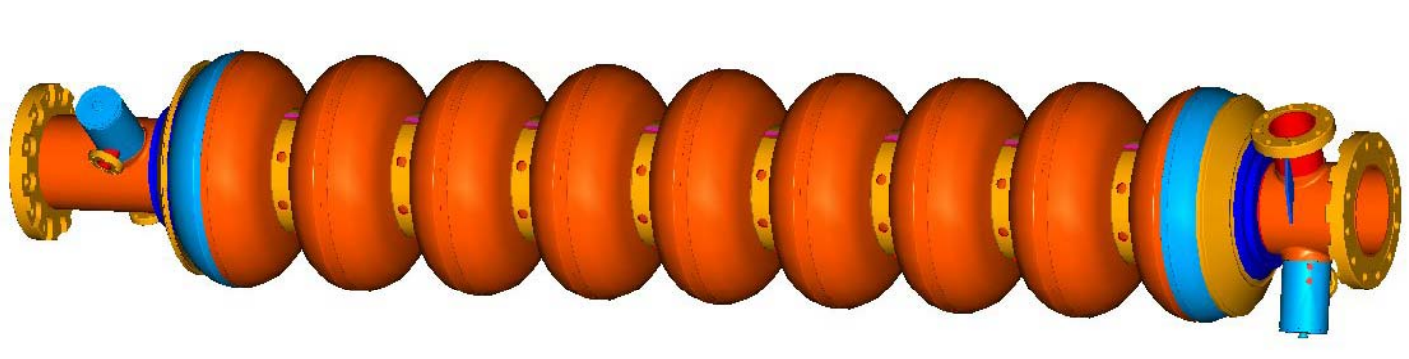
Sep 2006 (updated Jul 2007)

- Introduction
- Cavity-related topics: Preparation process
  Cavity test
- LINAC-related topics: => Hans Weise

Introduction

- List of Cavity-related topics:
  - Cavity preparation process incl. quality control
  - Improvement of cold vertical + horizontal rf measurement
  (- Tuning machine => D. Proch)
- Most topics: Proof-of-principle exists!
  Required solution: well engineered, reliable, user friendly, easy to handle, easy data access, etc….



Cavity preparation process

- **Improvement of process water control**:
  i) Description: Use better integrated sensors and controllers for reporting. Basically this is a controls / process monitoring infrastructure project (slow control data logging required).
  ii) Contact people: John Mammosser (SNS), Axel Matheisen (DESY), Detlef Reschke (DESY), Marc Ross (FNAL), Saclay, JLab
- **Improve efficiency of high-pressure rinsing:**
  i) Description: Better understanding of HPR required. Force measurements of different HPR nozzles on the way. Engineering project to measure the dependency of force vs. pressure, nozzle shape etc. . Next step is to evaluate the cleaning efficiency of HPR on real Nb surfaces (flat and curved).
  Ii) Contact people: **Paolo Michelato (INFN),** Detlef Reschke (DESY), Axel Matheisen (DESY), Marc Ross (FNAL)

Cavity preparation process II

- **Development of water filtration / particulate counting diagnostics**:
  i) Description: related to above. Counting particles on the high pressure side. Online via particle count or add./alternative use filter for particle identification
  ii) Contact people: John Mammosser (SNS), Detlef Reschke (DESY), Axel Matheisen (DESY), Marc Ross (FNAL), Tim Rothgeb (JLab)
- **Development of diagnostics to analyze the HPR effluent for particles etc.**
  i) Description: Could include the optical / x-ray emission analysis of the filter papers. A more comprehensive, industrial analysis would be useful.
  II) Contact people: Axel Matheisen (DESY), Detlef Reschke (DESY), Marc Ross (FNAL)

Cavity preparation process III

- **CO2 effluent (same as above, but with the gas that emerges during the dry ice processing)**
  i) Description: Witness samples.
  ii) Contact people: Detlef Reschke (DESY), G. Müller (Univ. Wuppertal), Marc Ross (FNAL)
- **Development/application of devices that can be used to study the surface of sample coupons**
  i) Description: Witness sample technique. Similar to technology used for disk drive manufacture. If one can do this, one might be able to consider studies of internal curved surfaces.
  => Study on available techniques done
  Ii) Contact people: Detlef Reschke (DESY), G. Müller (Univ. Wuppertal), John Mammosser (SNS), Marc Ross (FNAL),

Cavity preparation process IV

- **Installation of EP in industry**
  i) Description: Monitor installation of EP systems in companies. Feedback into laboratory. Experience with industry required.
  ii) Contact people: Axel Matheisen (DESY)

Vertical rf measurement

- **Improvements to the xray monitors used in multicell studies**
  i) Description: Include calibration, geometric coverage, and signal bandwidth.
  ii) Contact people: Wolf-Dietrich Möller (DESY), Marc Ross (FNAL), Detlef Reschke (DESY),
  iii) Options: Few diodes around the irises (~8) at fixed positions, simple mount
- **Development of a multi-cell t-map harness**
  i) Description: This most obvious project is on the minds of many, especially as the number of vertical test stands will grow. Improved calibration procedures?
  Ii) Contact people: Wolf-Dietrich Möller (DESY), Camille Ginsburg (FNAL), Marc Ross (FNAL), Detlef Reschke (DESY),

Vertical rf measurement II

- **Dark current measurement in vertical test**
  i) Description: Measurement of dark current during in VTA using faraday cup-like detector behind thin stainless steel window. Other techniques?
  Contact people: Hans Weise (DESY), Camille Gainsburg (FNAL), Marc Ross(FNAL), Detlef Reschke
- **Development of decay time analysis software**
  i) Description: Include estimates of RF properties from transmitted /reflected signals.
  ii) Contact people: Tom Powers (FNAL), Andre Gössel (DESY), Detlef Reschke (DESY), Marc Ross (FNAL),