9mA meeting

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Agenda

- 9mA workshop
- Data analysis
- DAQ refresher / online database

First announcement:
Workshop on TTF/FLASH 9mA studies

- Discuss results and lessons from the Sept 9mA studies, consolidate what was learnt, and plan future studies.
- Will address both ILC and XFEL/FLASH interests
- At DESY, tentatively two days in February (Feb 22/23?)

Proposed topics / sessions

- FLASH operations and Technical System reports
- Results / data analysis
- Working Groups on major 'lessons-learnt' themes (conveners?)
- Planning for machine studies
    - **Continuation of 9mA studies: R&D for ILC, FLASH/XFEL**
    - **Operation of FLASH with long bunch trains**

Data analysis - critical

- It is critical that we capitalize on the Sept studies
  - **…and that we do so before memories fade**

- Operationally, we must build on what was done for the next time (repeatability, rapid machine tuning)
  - **Make efficient use of future studies time**
- Bring measurable and visible benefit to FLASH operations (BAC, DESY Mgmt)
  - **A pre-requisite for proposing future 9mA studies**
- Show progress towards ILC R&D goals
- Milestone dates
  - **9mA Workshop**
  - **Studies proposal submissions for Spring '10**

Analysis of Sept studies data

- How to organize and who will do the analyses…?

- Several categories
  - **Machine tuning**
    - Orbits, LLRF, beam stability, sensitivities, parameter stability,…
  - **Diagnostics**
    - bpms, energy server, new dump-line diagnostics,…
  - **Machine protection**
    - Beam loss alarm thresholds
  - **Feedback & automation**
    - Adaptive FF, orbit feedback, injector stabilization
  - **ILC R&D**
    - Operation at the limits (stability, jitter, beam loading, cavity gradient, RF power)

Focus of analyses: FLASH operations

- *What can we learn from the data that will help speed up machine tuning with long bunch trains and high beam loading?*

- What consumed the most time in Sept…?
    - **Injector tune-up**
    - **Finding the golden orbit (orbits?)**
    - **LLRF tuning**
    - **(Commissioning, troubleshooting,…)**

- Need to quantify the 'good' conditions we'd need to reproduce
- Stability of key parameters, sensitivity to jitter, drift, etc
- Optics, energy measurements,…
- Multi-bunch effects over long bunch trains – LOLA measurements indicate beam breakup over the bunch train

- Long-pulse high beam loading (9mA) demonstration
  - **800μs pulse with 2400 bunches (3MHz), 3nC per bunch**
  - **Cavity gradients approaching quench limits**
  - **Beam energy 700-1000MeV**
  - **Vector Sum control of up to 24 cavities, ±0.1% energy stability**

- Characterize operational limits
  - **Energy stability limitations**
  - **Klystron overhead needed for LLRF control**
  - **HOM absorber studies (cryo-load)**

- Operation close to limits, eg
  - **Robust automation of tuning, etc**
  - **Quench detection/recovery, exception handling**
  - **Beam-based adjustments/optimization**

- Mainly parasitic measurements in Sept – but valuable information
- Use the data to guide proposals for future (targeted) studies