Two beam test stand

(status on 2007.04.10)

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Principle objectives of two-beam test stand:

High-power test of PETS - first full pulse length tests of CLIC (lengthened) prototypes

12 GHz high-power test of accelerating structures

Measurement of kick from rf breakdown

High-power test of PETS on/off mechanism

Operation of CLIC module

Must be built to be flexible and easily reconfigured
Organisation

- CERN AB and SLAC: RF design
- CERN TS: mechanical design of PETS and ac. structures + rf components
- CERN AB and Pakistan, National Institute of Physics:
  - design of the overall layout and integration,
  - design, fabrication, installation and commissioning of the experimental vessels and related subsystems

For two-beam test stand
- Uppsala: layout, instrumentation and experiments.
- Saclay: the probe beam and experiments.
Valve coordinates

- Center the two experimental areas (check also wrto the clic module) (GR)
- recheck length of the table (RR)
Phases

- Phase 1: PETS and loads (no accelerating structures)
- Phase 2: PETS and one accelerating structure
- Phase 3: PETS and a series of accelerating structure (clic module)
Phase 1

PETS \( 174 \text{ MW} \times (1/0.8)^{0.5} = 270 \text{ MW} \times 140 \text{ ns} \)

120 MW/load x 5 Hz x 140 ns

Beam direction
30 A, 140 ns
Phase 3
Tank

- Easy to open/close (gasket + bolts)
- Tooling to extract/introduce the structure
- Shall include alignment/supporting/cooling.. Functions
- Integrate also the WG network

Strategy
- How many tanks: 2 (one for operation and one for preparation)
- Which dimensions: 1.8 m long, diameter 400 mm
Tank

Warning: total length of the tank including extremities!
Cooling

- Different possibility:
  - No water inside the tank
  - Water inside the tank:
    - Inside the PETS bars
    - Outside the PETS bars (favorite solution)

- Contact R. Corsini to get the average beam loss for the PETS
- Add collimator between RF finger and PETS inside the tank to be water cooled
Alignment and supporting system

• Specification: alignment precision 10 μm
• Adjustable internal supporting system
  – Dz: +/-10 mm
  – Dx: +/- 5 mm
  – Dy: +/- 5 mm
• Adjustable external supporting system (values to be confirmed by RR)
  – Dz: +/-10 mm
  – Dx: +/- 5 mm
  – Dy: +/- 5 mm
• Targets and « inclinomètre » on the tank
  – Alignment wrto the reference beam axis ➔ fixed position
  – Alignment wrto the reference targets
Cover plate

- Based on the replacement PETS design
- RF contact
  - We need the RF contact
  - Use RF contact design
RF components

• Collaboration with SLAC
  – SLAC drawings to be adapted to our needs (Alexej, Raquel, Igor, Riccardo)
  • First meeting next week
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Two-beam test stand schedule

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<th>RF components</th>
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Installation & O&G: Commissioning