Update on Studies of the 200 MHz TW RF system

Outline

• Comparison: measurements vs simulations
  • 1-section
  • 4-section
• Existing impedance model
• Efforts on further reduction of HOM impedance
• Conclusions & outlook
1-section “Workshop model”:
• Loaded
• Measurement agrees with simulation
• Remaining peaks 630 MHz and 642 MHz: Transverse modes
Measurement vs simulations: 4-section

4 section “Tunnel model”:
- Loaded HOM couplers
- Simulation model does not represent actual cavity in tunnel

4 section “Tunnel model”:
- Included FPC couplers, 630 HOM
- Not included: 460 HOM, 938 HOM: → include
Measurement vs simulations: 4-section

4 section “Tunnel model”:
• Loaded HOM couplers
• Simulation model does not represent actual cavity in tunnel

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• Included FPC couplers, 630 HOM
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Modelling in Progress
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Existing impedance model

- Existing impedance model can be reproduced with today's simulation model
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- Good agreement between HOM impedances (550 MHz, 630 MHz)
- 655 MHz: 2.5 MHz shift (0.4%)
- Possible causes:
  - Meshing
  - Boundary conditions
  - Other numerical
  - ...
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Efforts on further reduction of HOM impedance

- Currently installed 628 MHz HOM dampers work very well
- Damper location in the cavity already optimal
- Installing more HOM couplers
  (Simulations: Ya. Shashkov, MEPhI, Russia)

→ Improvement: 30%

Fig courtesy: Ya. Shashkov

Top: same dampers
Right: different design needed
(hook/loop)
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Conclusions & Outlook

1. Measurement based verification
   • 628 MHz HOM dampers work very well
   • Feeder line limited contribution to damping
   • 1 section: very good agreement meas.– simulations
   • 4-section: in progress: model possibly needs to be extended with transverse HOM couplers

2. Existing impedance model reproduced

3. Further reduction of HOM impedance
   • Studies ongoing
   • Doubled # dampers
   • Loop-dampers at pickup loop location