



## LHC Injectors Upgrade



# Update on Studies of the 200 MHz TW RF system

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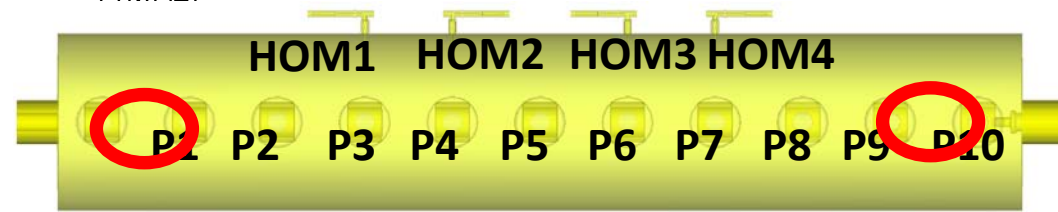
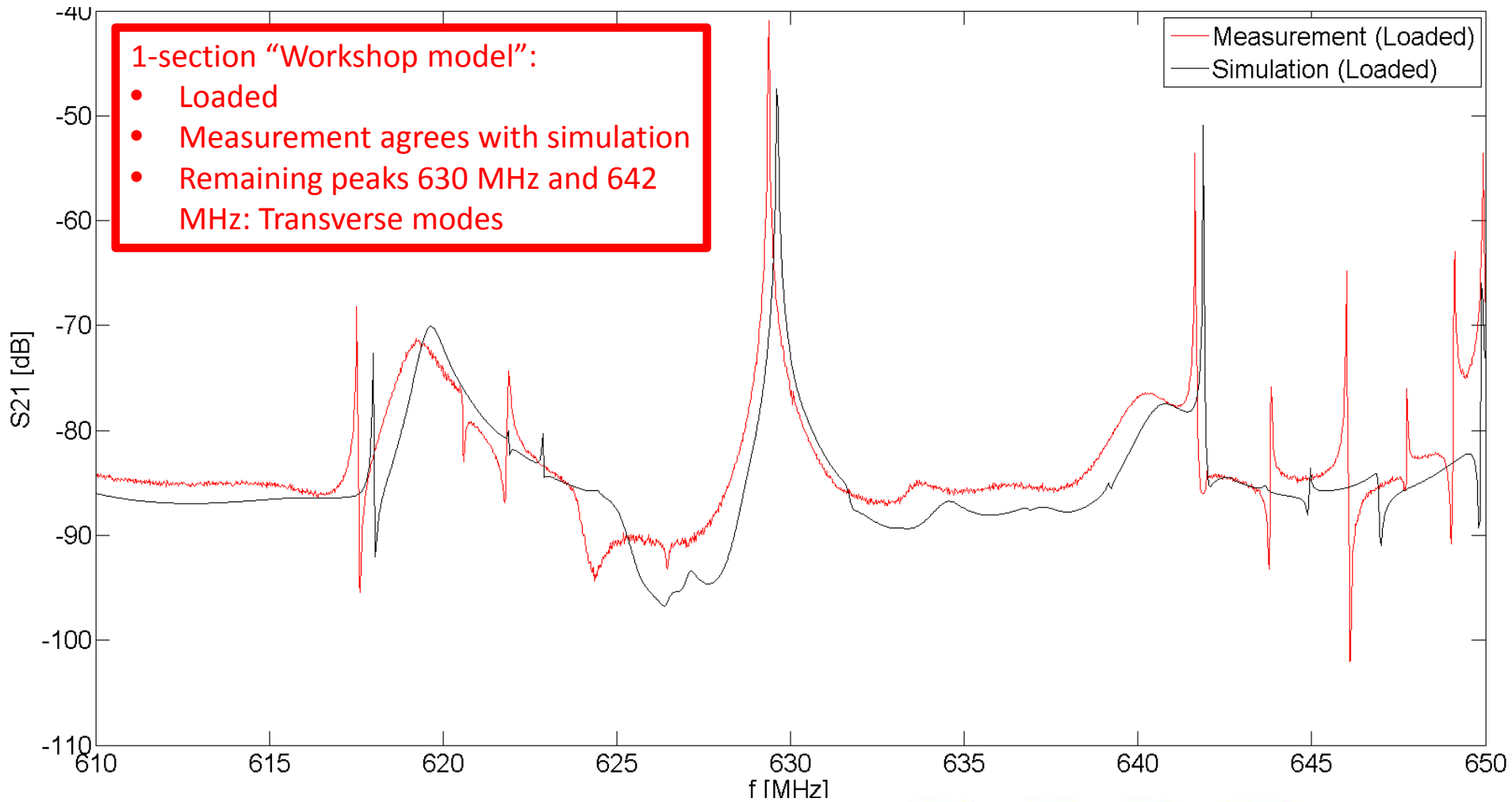


# Outline

- Comparison: measurements vs simulations
  - 1-section
  - 4-section
- Existing impedance model
- Efforts on further reduction of HOM impedance
- Conclusions & outlook



# Measurement vs simulations: 1-section





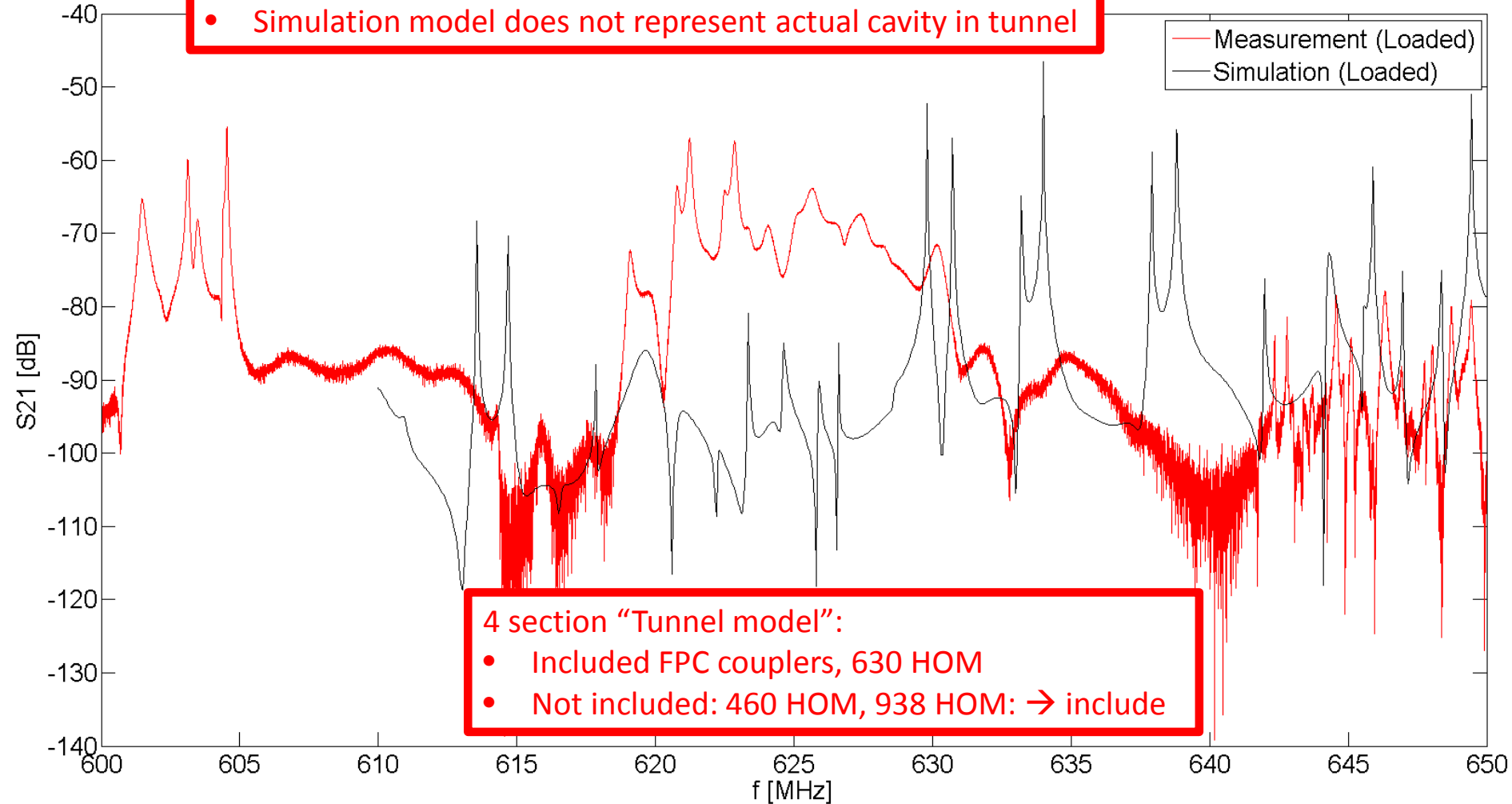
# Measurement vs simulations: 4-section

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



I



II

III



IV



# Measurement vs simulations: 4-section

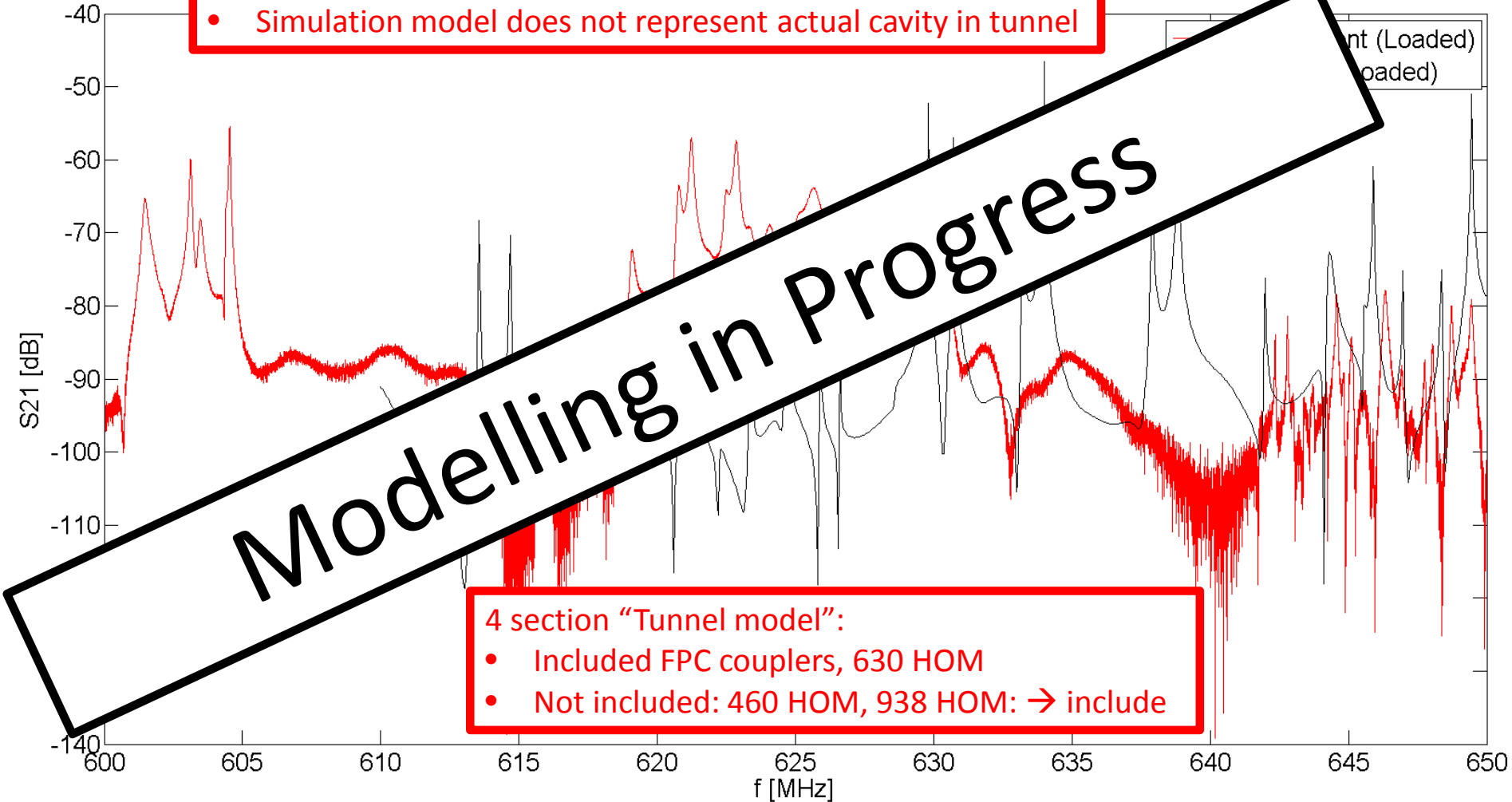
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Modelling in Progress

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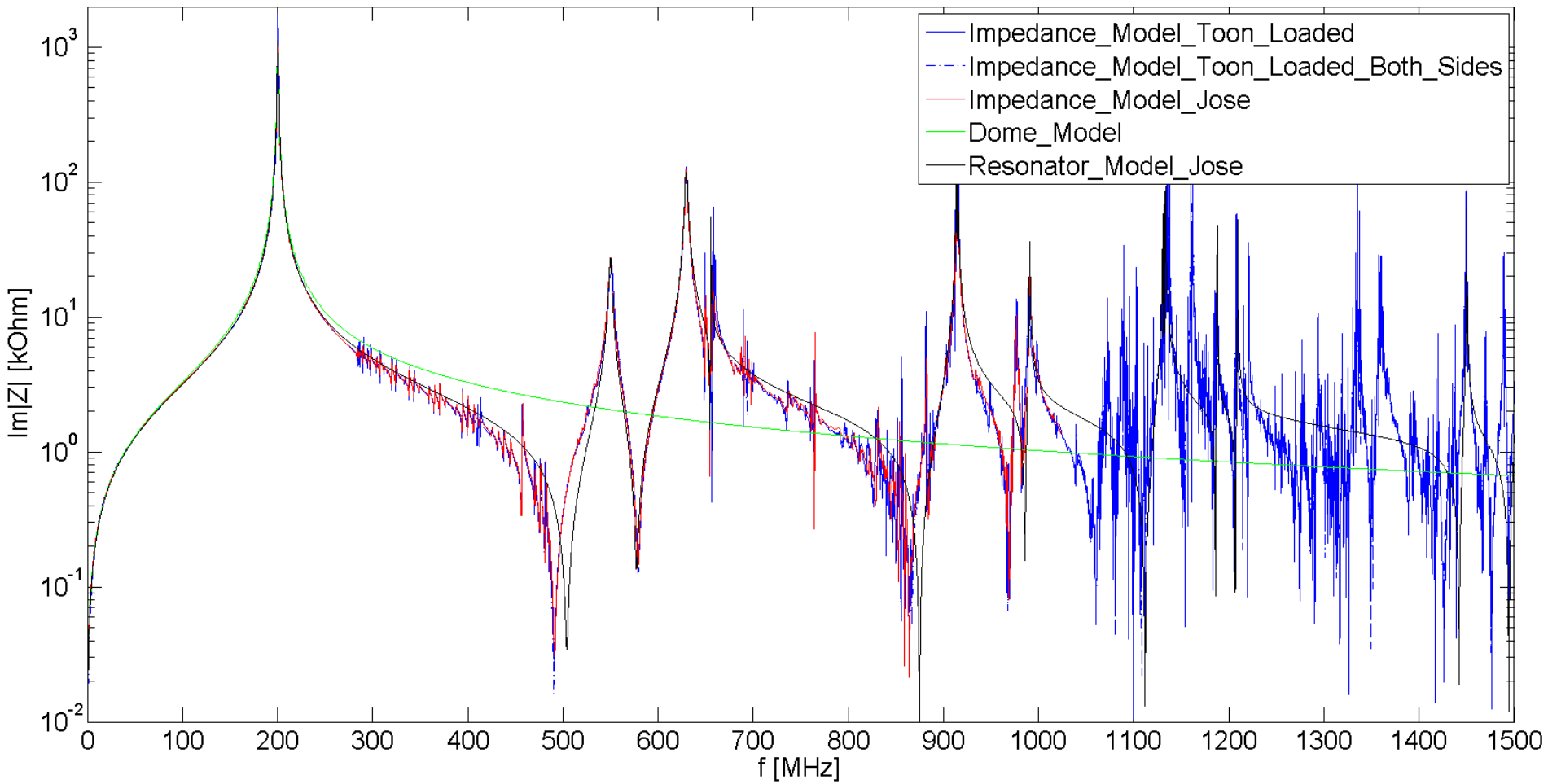
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## Existing impedance model

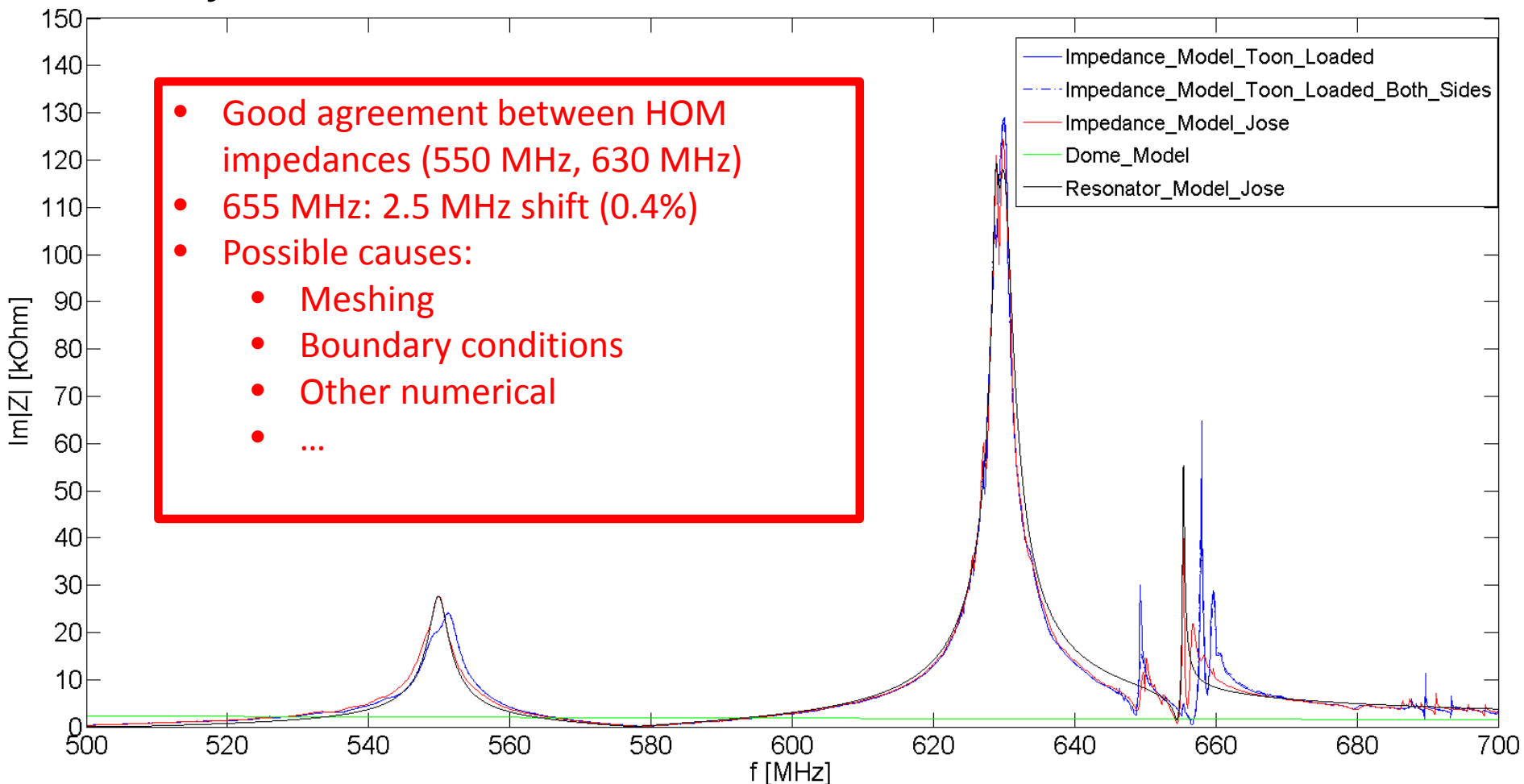
- Existing impedance model can be reproduced with today's simulation model





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# U 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 %

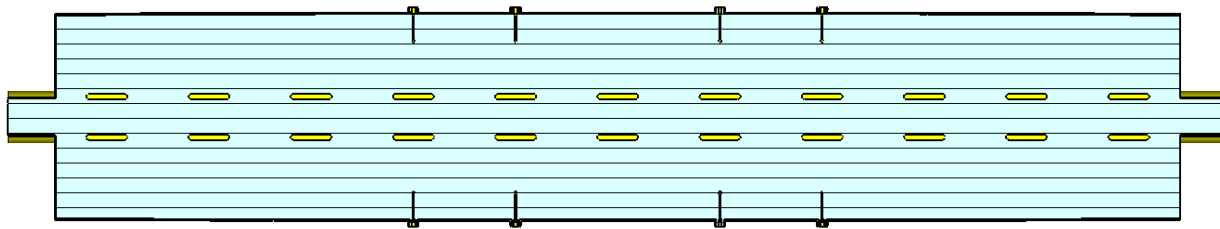


Fig courtesy: Ya. Shashkov

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

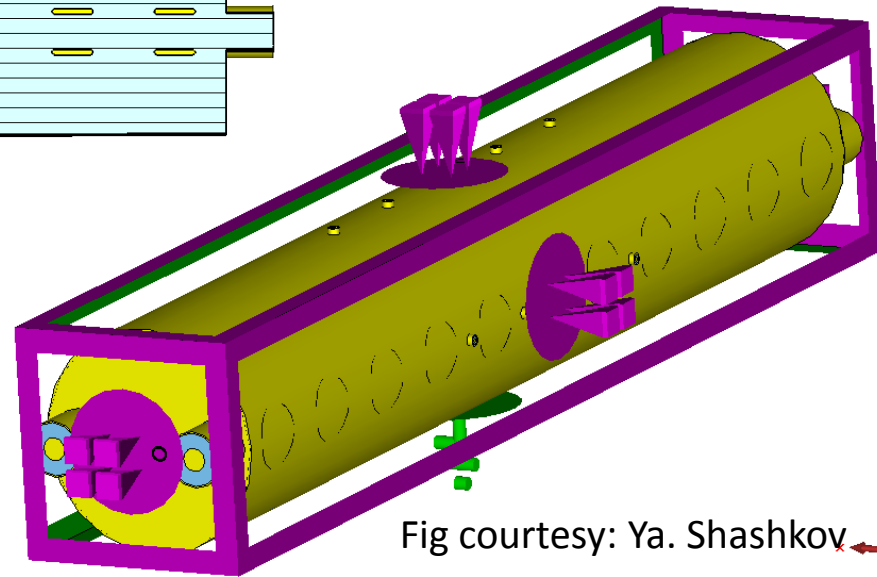


Fig courtesy: Ya. Shashkov



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- Comparison: measurements vs simulations
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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

