



Present Status of the SPS 200 MHz TWC Higher Order Mode Upgrade

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200 MHz TWC HOM upgrade outline



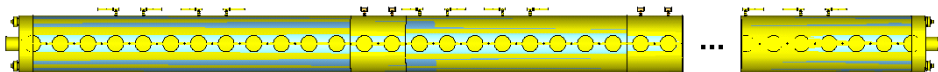
- Step 1): Find impedance spectrum of cavities
- Step 2): Define minimum required damping for selected frequency ranges
- Step 3): Decide on HOM couplers (improvement/ redesign)
(by end of 2016)
- Step 4): Implementation/ Verification

- Present cavity configuration in the SPS tunnel
- Status on step 1): Impedance spectrum
 - Wakefield simulations
 - R/Q - measurements in the lab
 - S-Parameter measurements in the tunnel
 - Possible further evaluation methods

Present configuration in the tunnel



- Two 4-section cavities
- Two 5-section cavities
- 460 MHz transverse HOM coupler (4 per cavity)
- 628 MHz longitudinal HOM coupler (4 per section)
- 938 MHz transverse HOM coupler (0-3 per section)

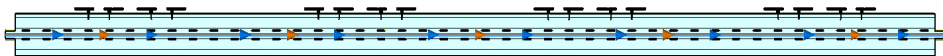


*model courtesy T. Roggen

Present longitudinal impedance model



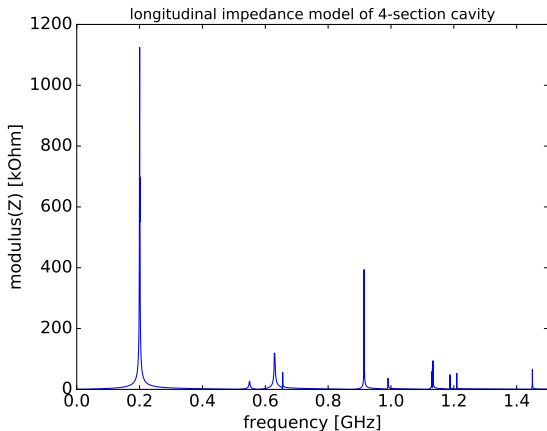
- Wakefield simulations
- 4- and 5-section cavities with 628 MHz couplers only



Present longitudinal impedance model



- Wakefield simulations
- 4- and 5-section cavities with 628 MHz couplers only



used by
BLonD
code

*data courtesy J. Varela

Lab measurements



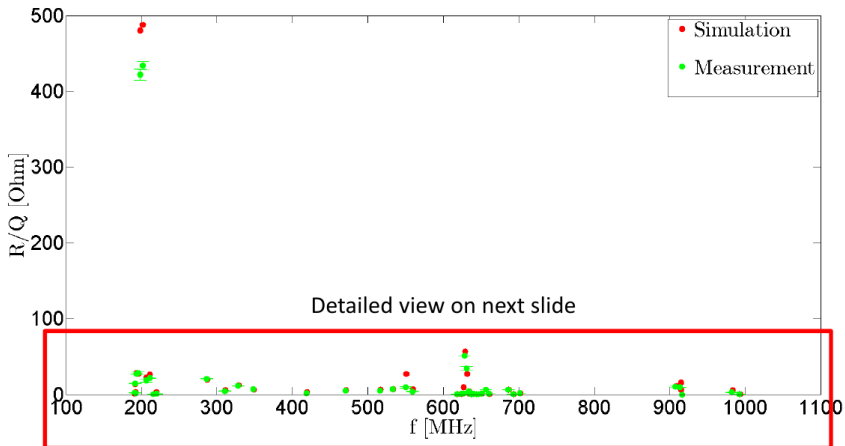
- Available equipment
 - 2-3 spare sections
 - 4 spare couplers of each type (no FPC)
- R/Q - measurements by perturbation



R/Q - measurements of a single section



- Comparison between Eigenmode simulations and perturbation measurements of a single section

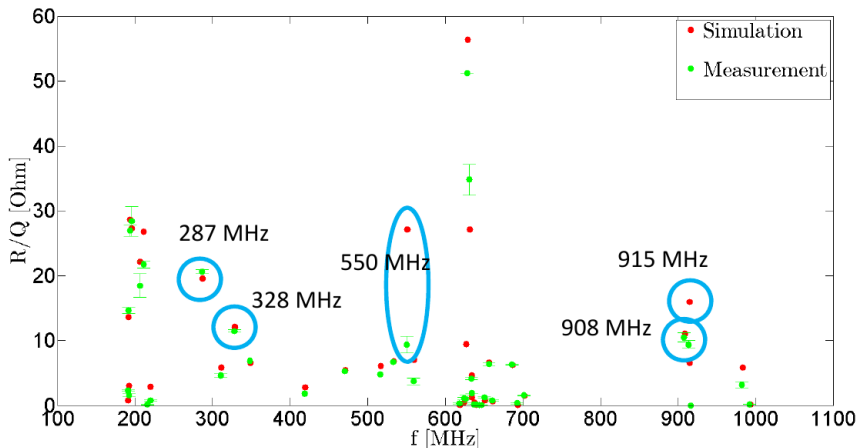


*fig. courtesy T. Roggen

R/Q - measurements of a single section



- Comparison between Eigenmode simulations and perturbation measurements of a single section

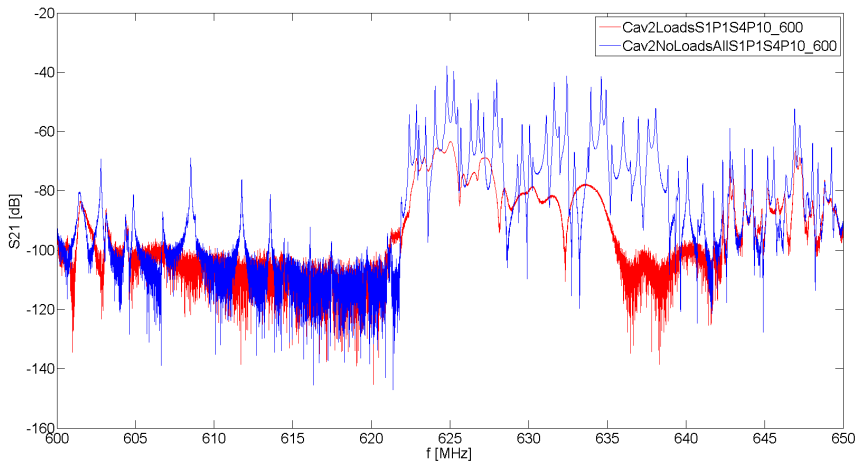


*fig. courtesy T. Roggen

S-Parameter measurements in the tunnel



- Performance of 628 MHz coupler

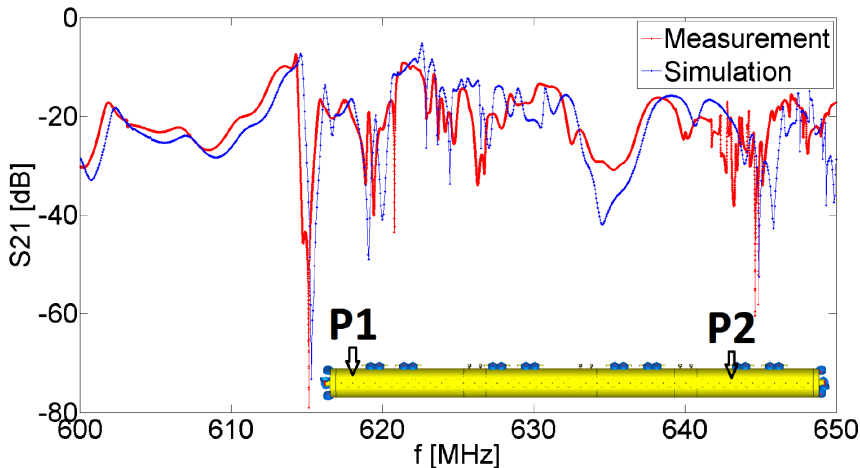


*fig. courtesy T. Roggen

S-Parameter measurements in the tunnel



- Performance of simulation models



*courtesy R. Calaga, T. Roggen, T. Kaltenbacher

Further evaluation of impedance



- Beam induced measurements



- Lab measurements
 - 2-3 spare sections
 - 4 spare couplers of each type (no FPC)
- Evaluate 3-section cavities