

*Geneva, 17 September 2004*  
*AB-ABP-LCE section meeting*

# **RF measurements of trapped modes in the SPS collimator prototype**

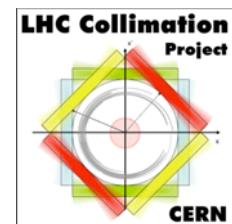
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## Contents

- Review of collimator design
- Experimental setup
- Measurement results
- Conclusions/outlooks



*CERN AB-ABP*  
*Switzerland*

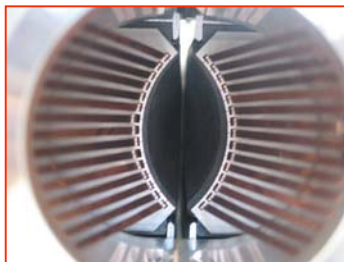
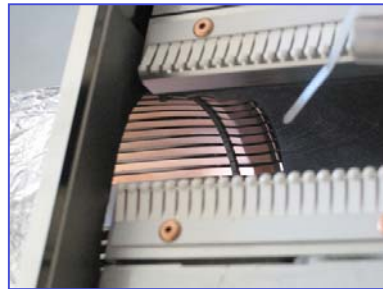


# The SPS collimator prototype

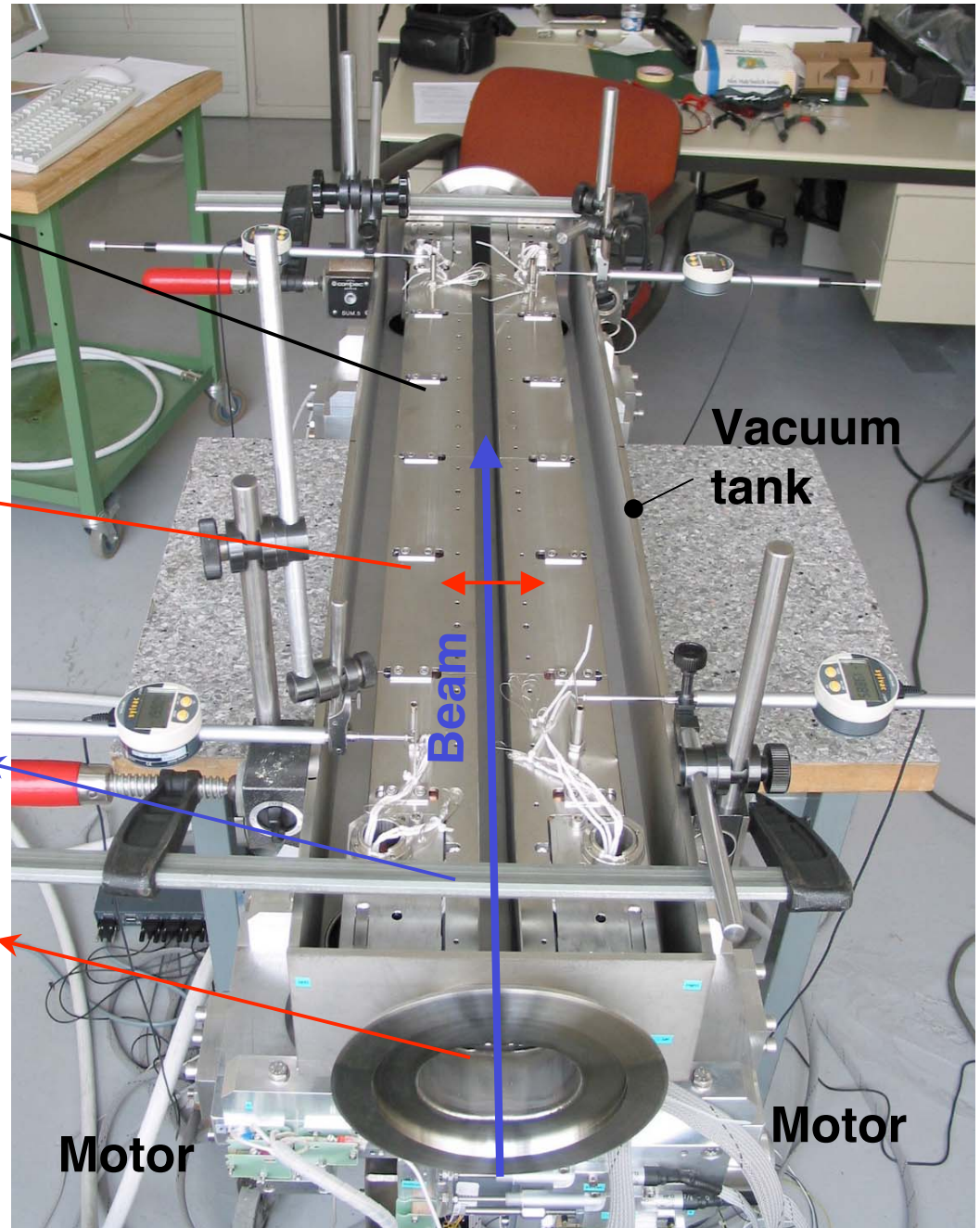
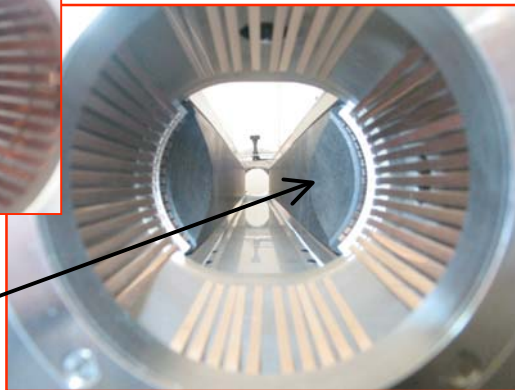
**Carbon jaws**  
(25 mm thickness)  
each can be independently moved (2 motors per jaws)

**Gap** (centred around beam):  
~ 60.9 mm → ~ 1 mm

RF contacts  
and fingers

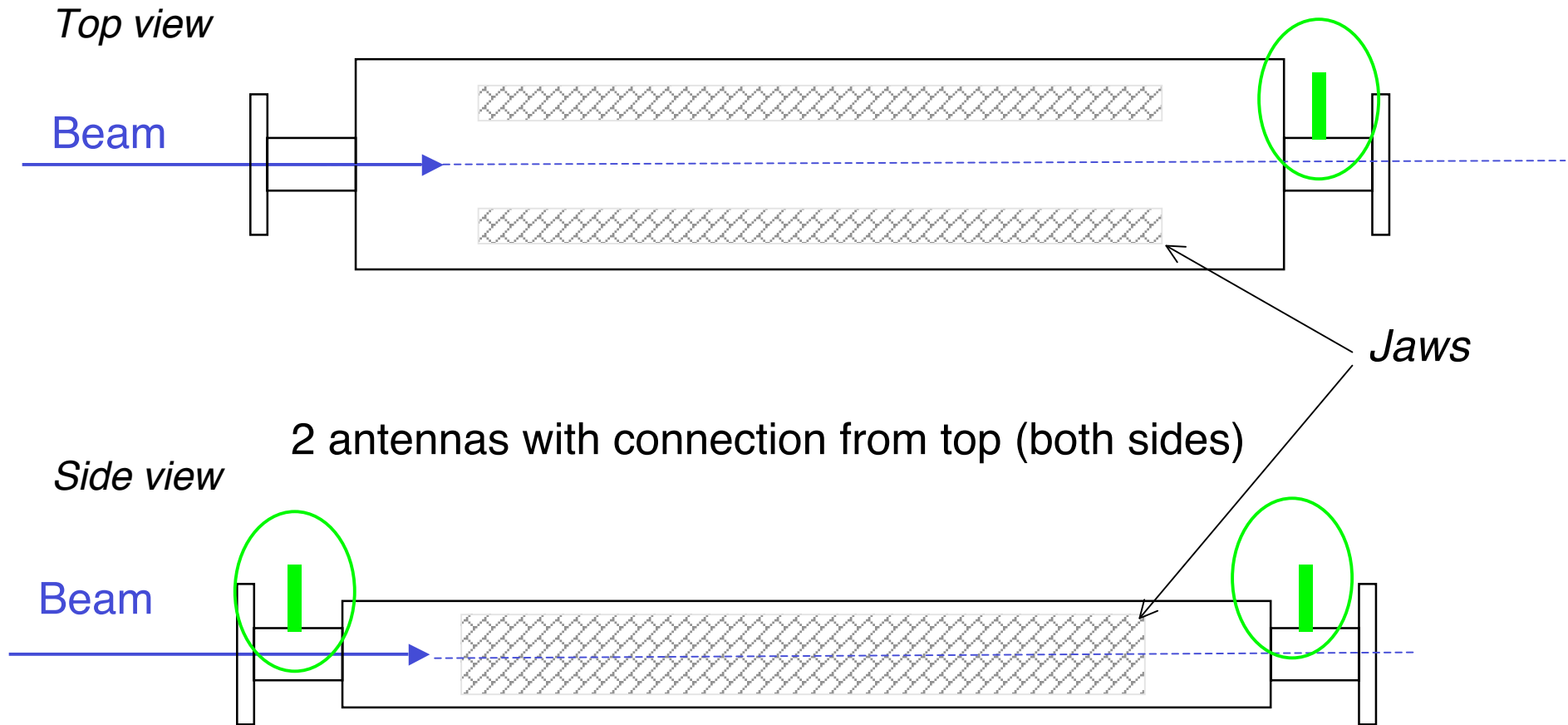


Tapering



# Installation of RF antennas in the SPS prototype (no drawings...)

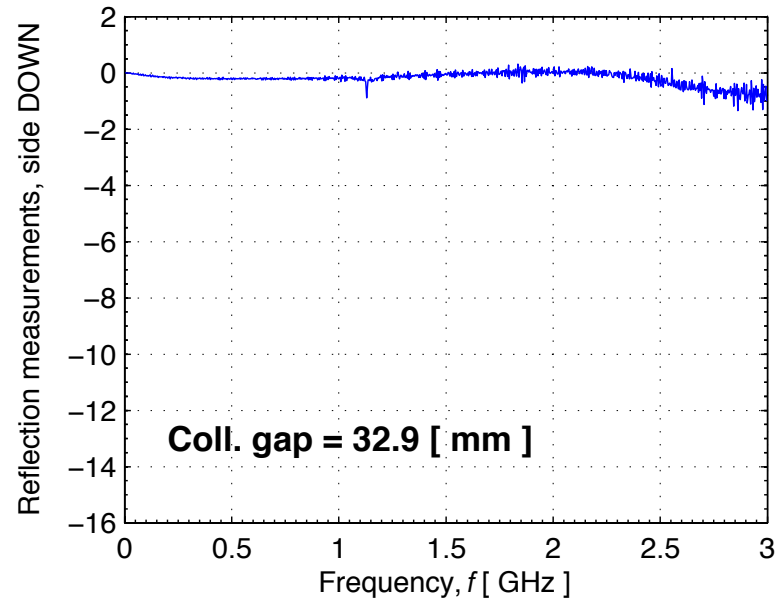
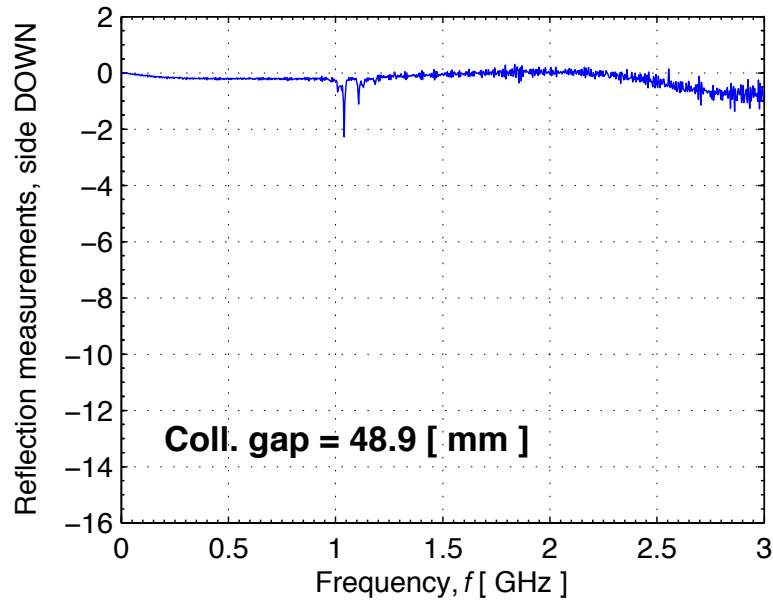
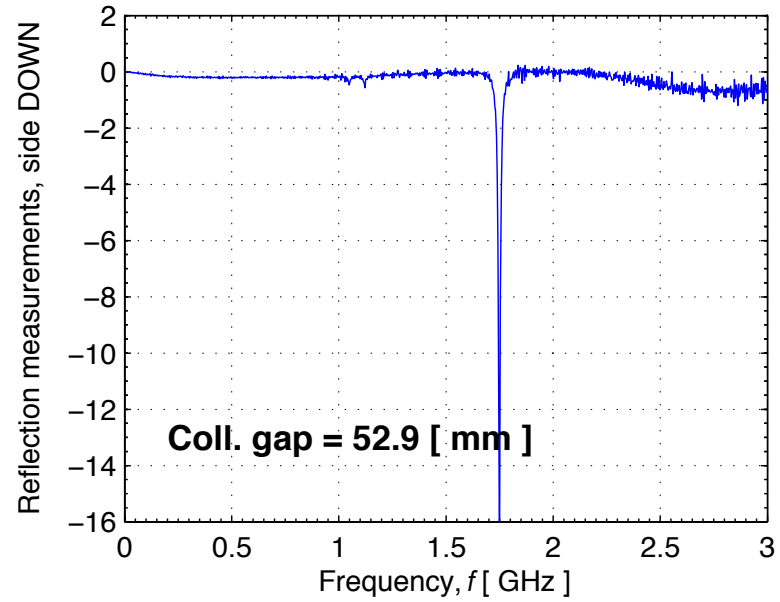
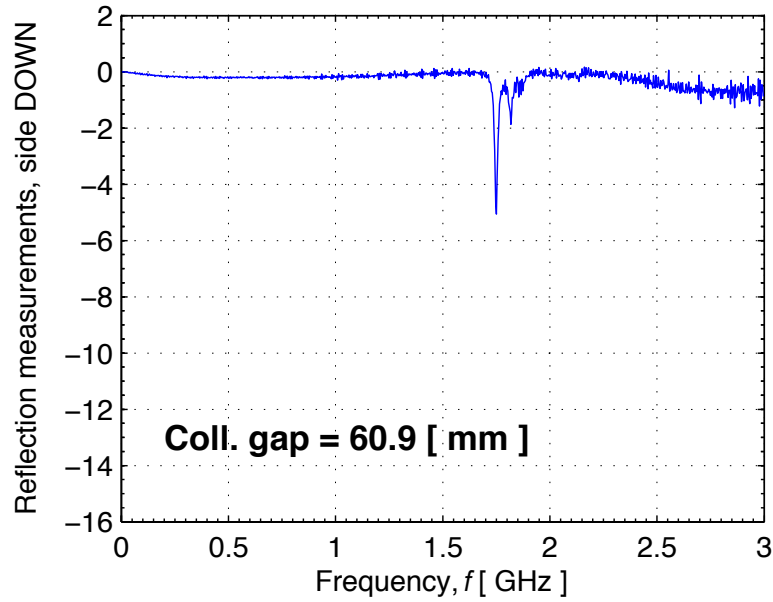
1 antenna with side connection (downstream)

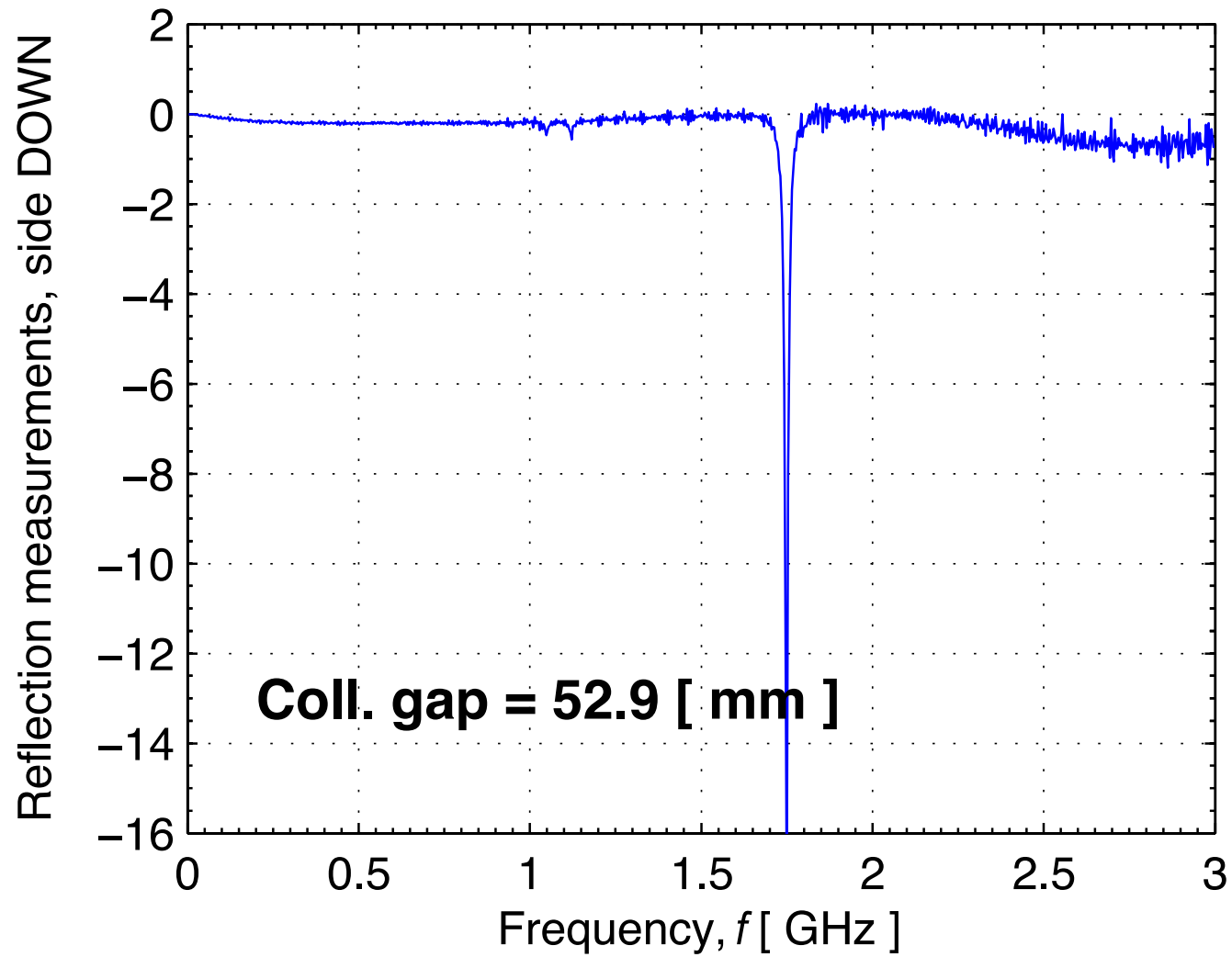


## Experimental conditions:

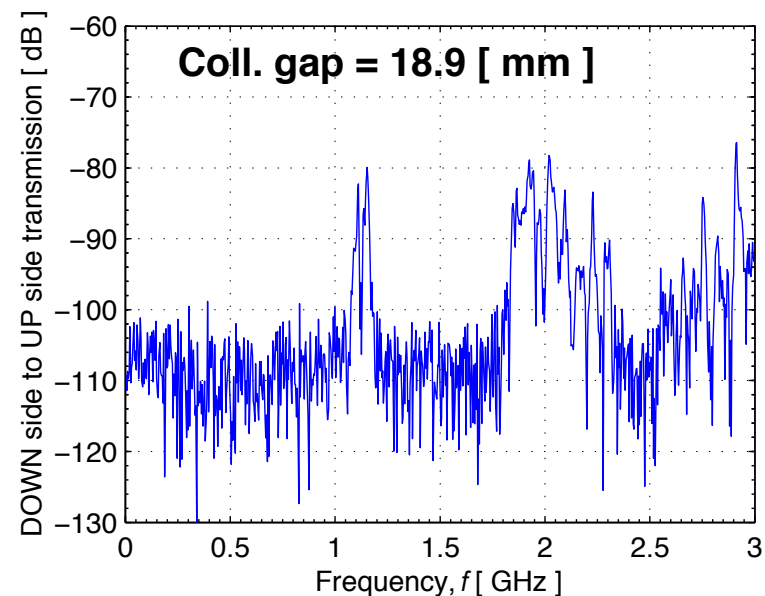
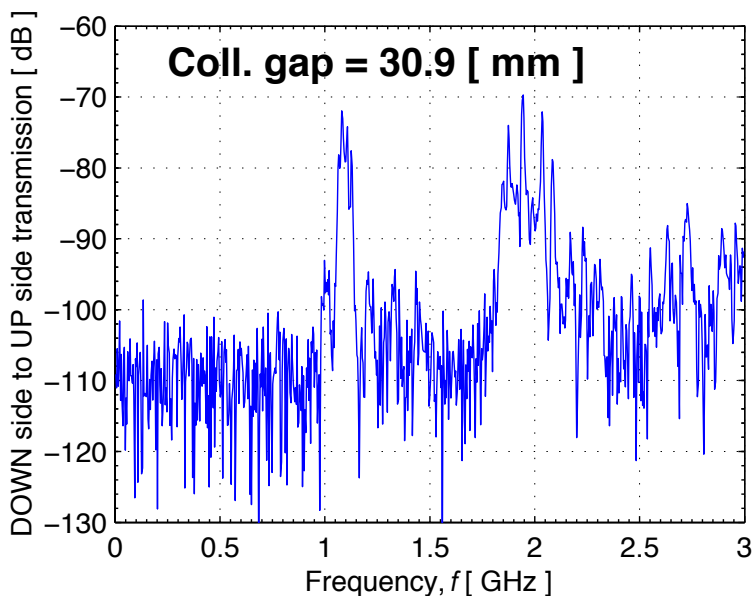
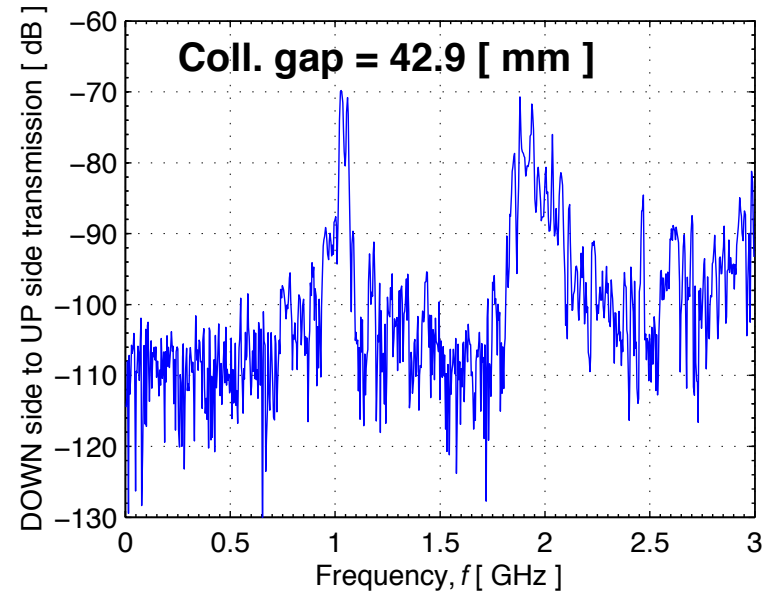
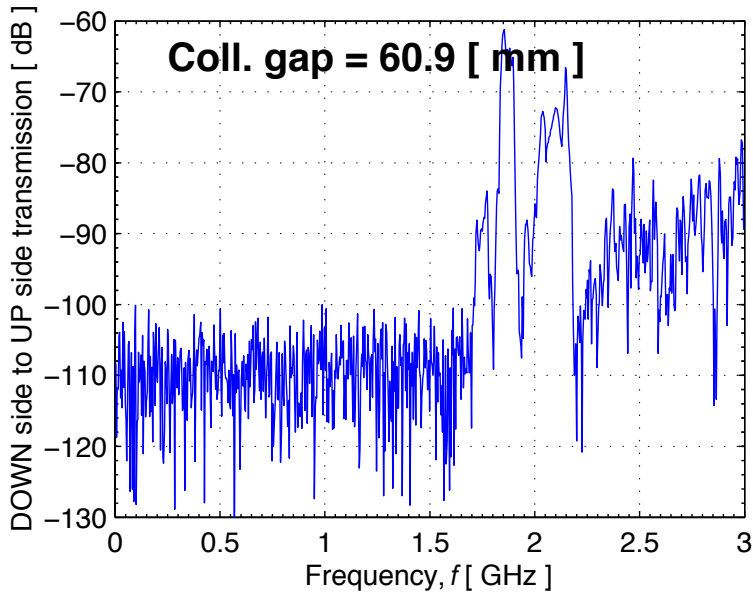
- Measurements performed in-situ, in the **SPS tunnel** (SS5) (short cables)
- A network analyser (up to 3 GHz) used to perform **transmission** and **reflection measurements** with different gap openings
  - transmission from side antenna to top antenna on the other side of the collimator (*most sensitive configuration*)
- **Remote control** of collimator **motors** from surface
  - Parallel movements of two jaws from full-out towards centre (~61 mm to ~20 mm)
  - Simultaneous displacements
  - Gap always centred around ideal beam trajectory (no asymmetric gaps)

# Reflection measurements





# Transmission measurements



## Conclusions

- ✓ Preliminary RF measurements of **trapped modes** in the SPS collimator show the indication of various modes:
  - *Reflection* measurements: **0.8 GHz** to **2.0 GHz**
  - *Transmission* measurements: **1.0 GHz** to **3.0 GHz**
- ✓ The peak positions and amplitudes **depend** strongly on the **collimator opening**
- ✓ The **effect on the beam** remains to be understood

## OutLook

Measurements will be performed with beam in the SPS (F. Caspers)

Possible issue: measurement from surface with ~ 300 m long cables