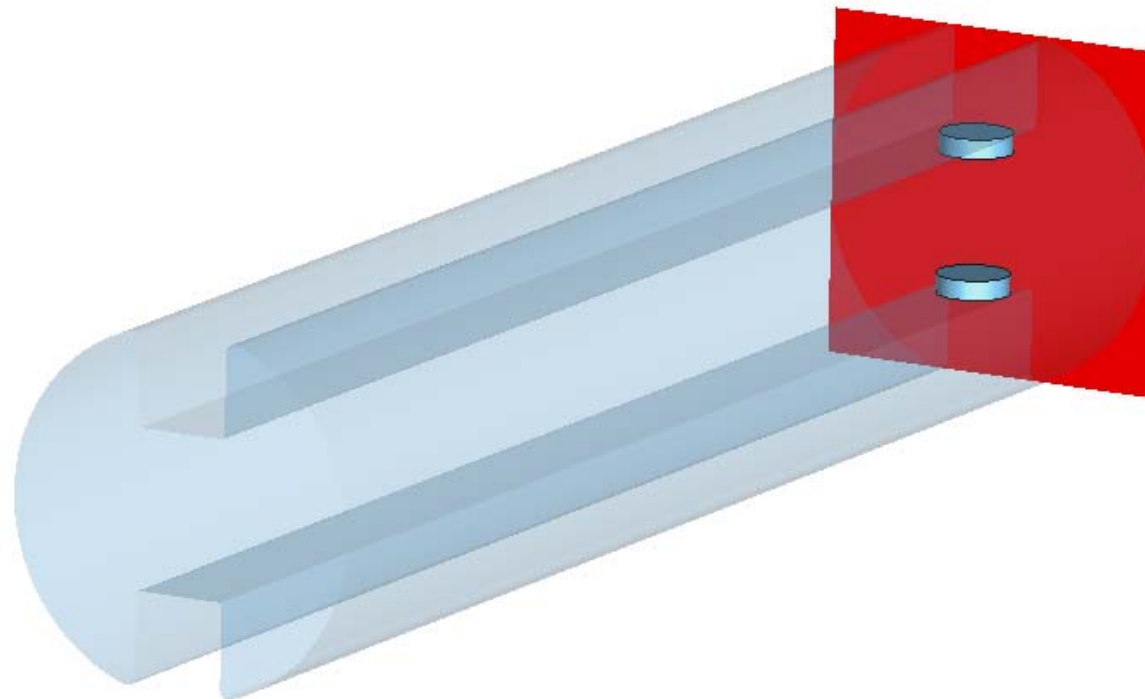


# Improving the representation of the real HOM damper by optimizing its current simplistic simulation model



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DARMSTADT

Leon Kronshorst, Wolfgang F.O. Müller



# Outline



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- Current HOM Damper Models
- Proposed Improvement to the Model
- Comparison of Simulation Results
- Conclusion and Outlook

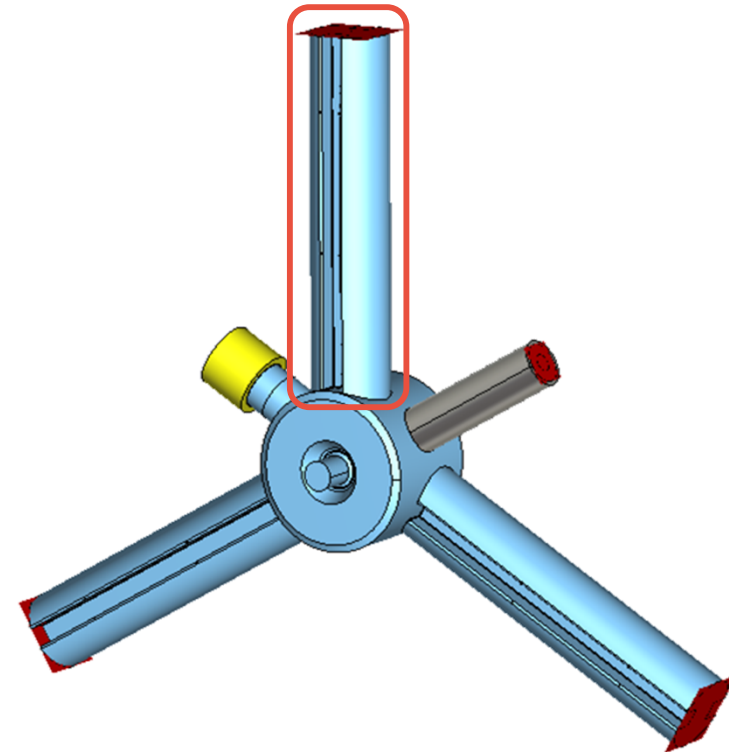
# The BESSY Cavity

- Measurement Setup of the Cavity



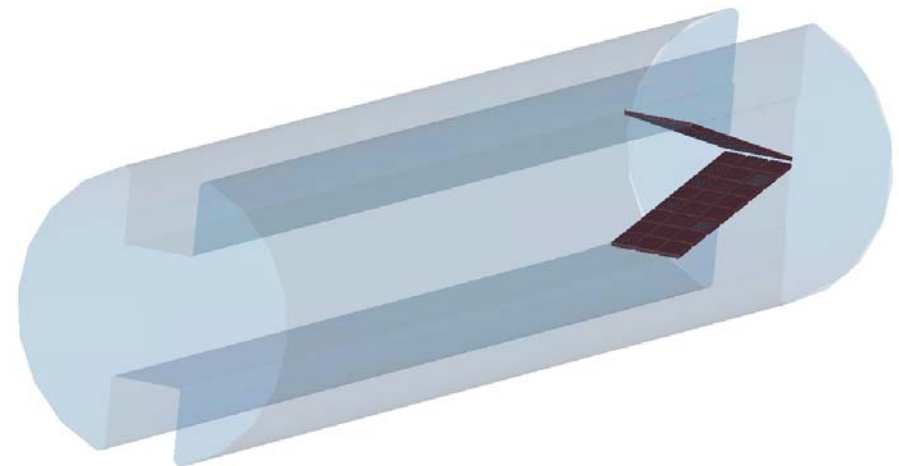
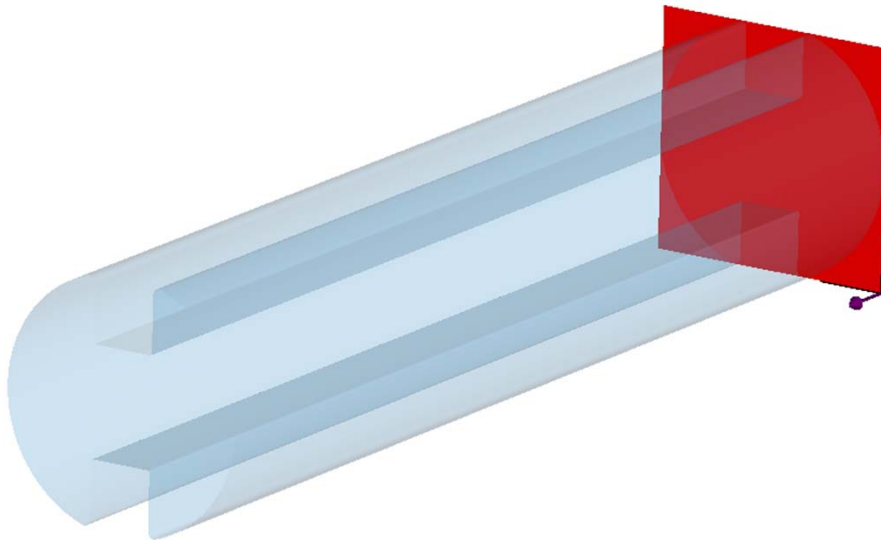
Source: Presentation by Weihreter 2010-09-30 –  
The BESSY Higher Order Mode

- Current Simplified Simulation Model



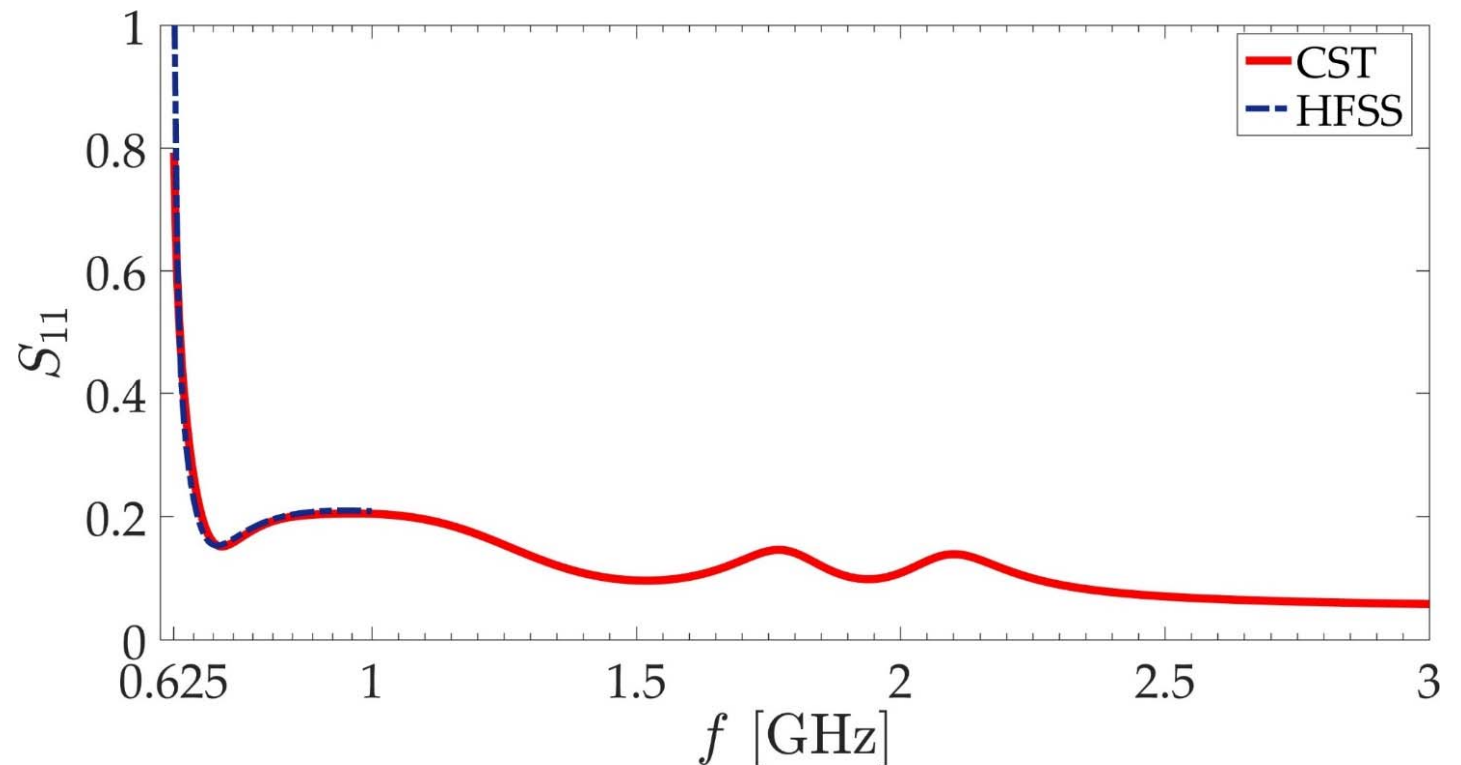
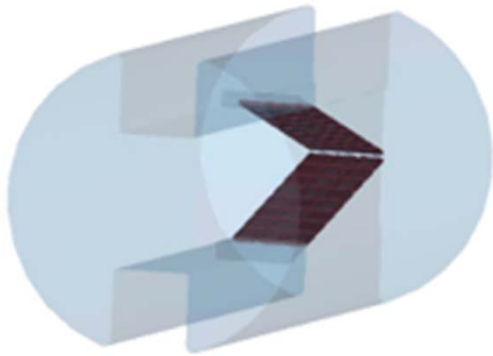
# Current HOM Damper Models

- Idealized Damper Model
- Realistic Damper Model



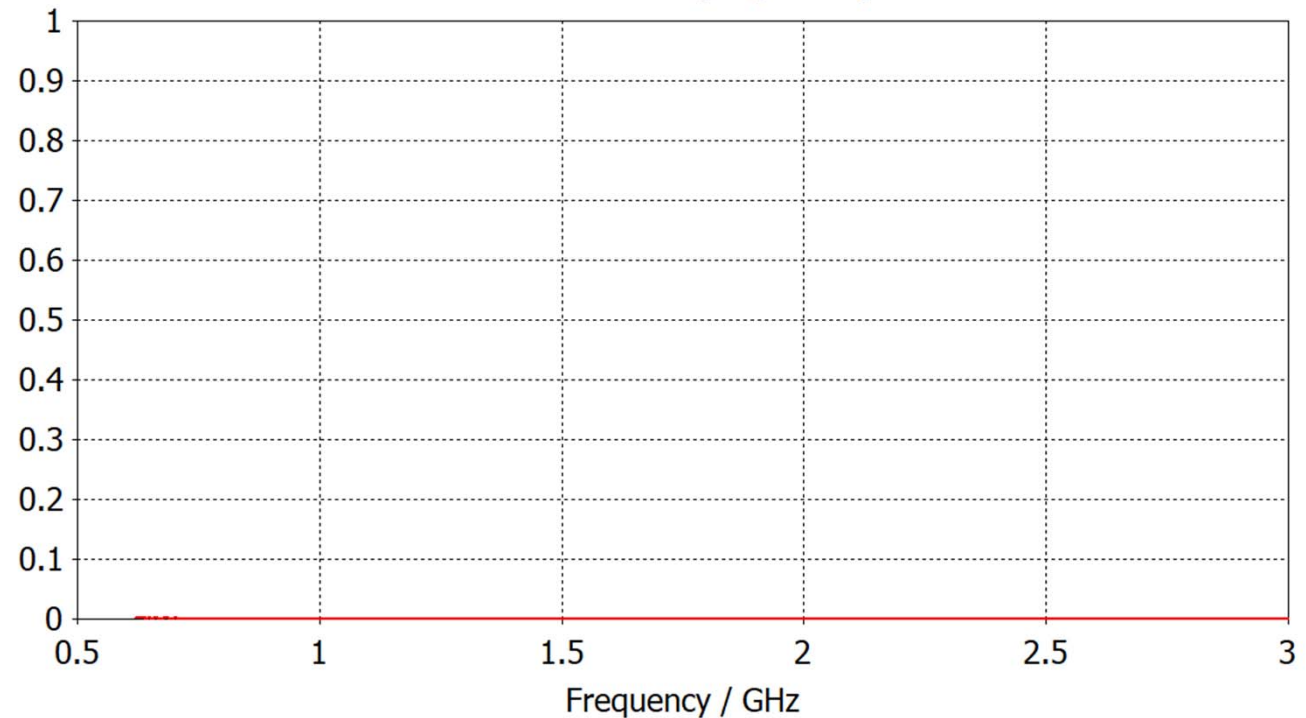
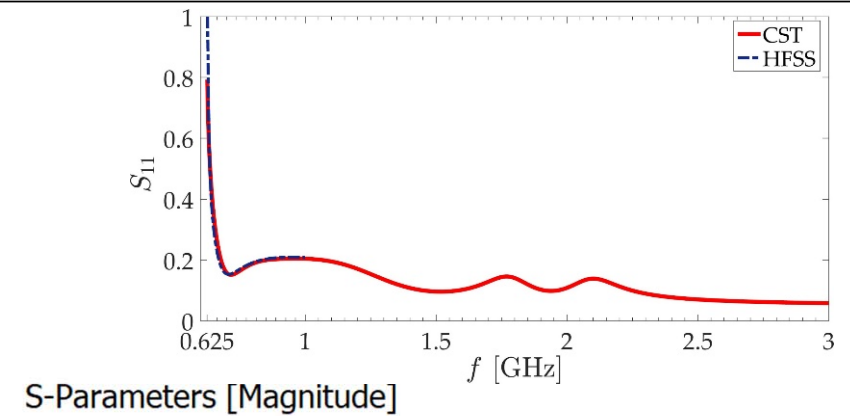
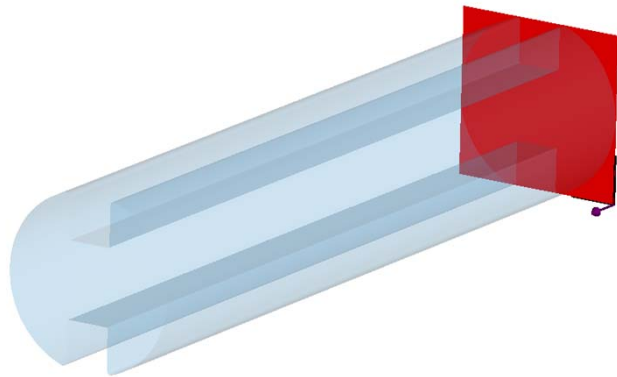
Source: Presentation by Bazyl 2019-06-13 – HOMs Study in the 500

# Simulated Reflection Coefficient



Source: Presentation by Bazyl 2019-06-13 – HOMs Study in the 500

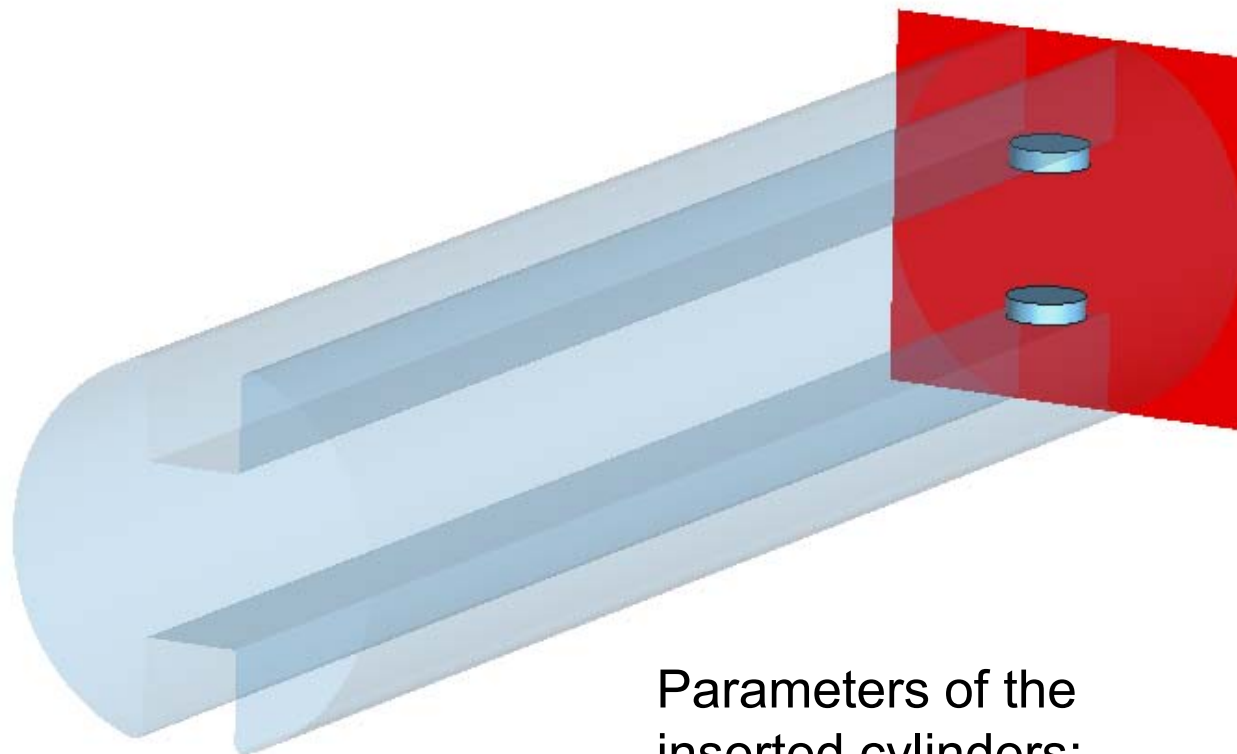
# Simulated Reflection Coefficient



# Proposed Improvement to the Model



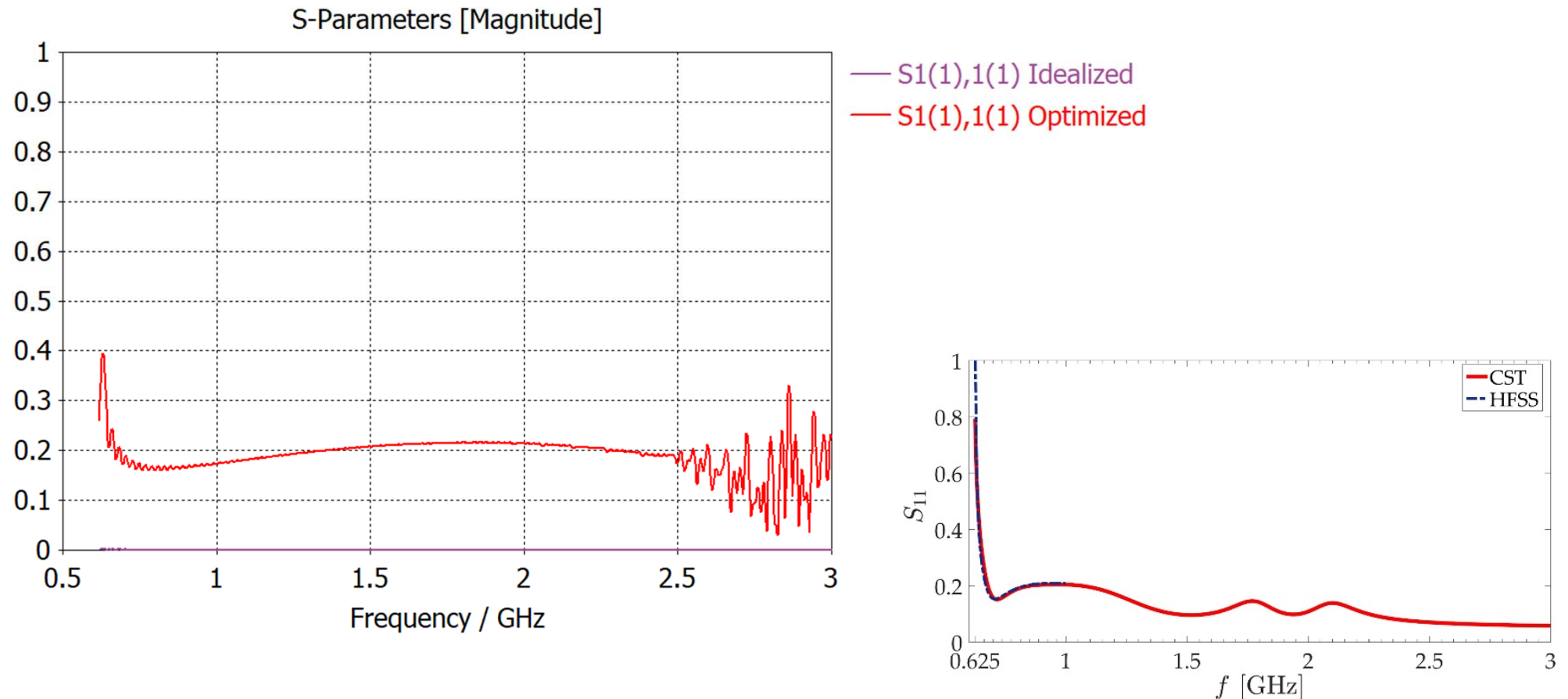
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Parameters of the  
inserted cylinders:

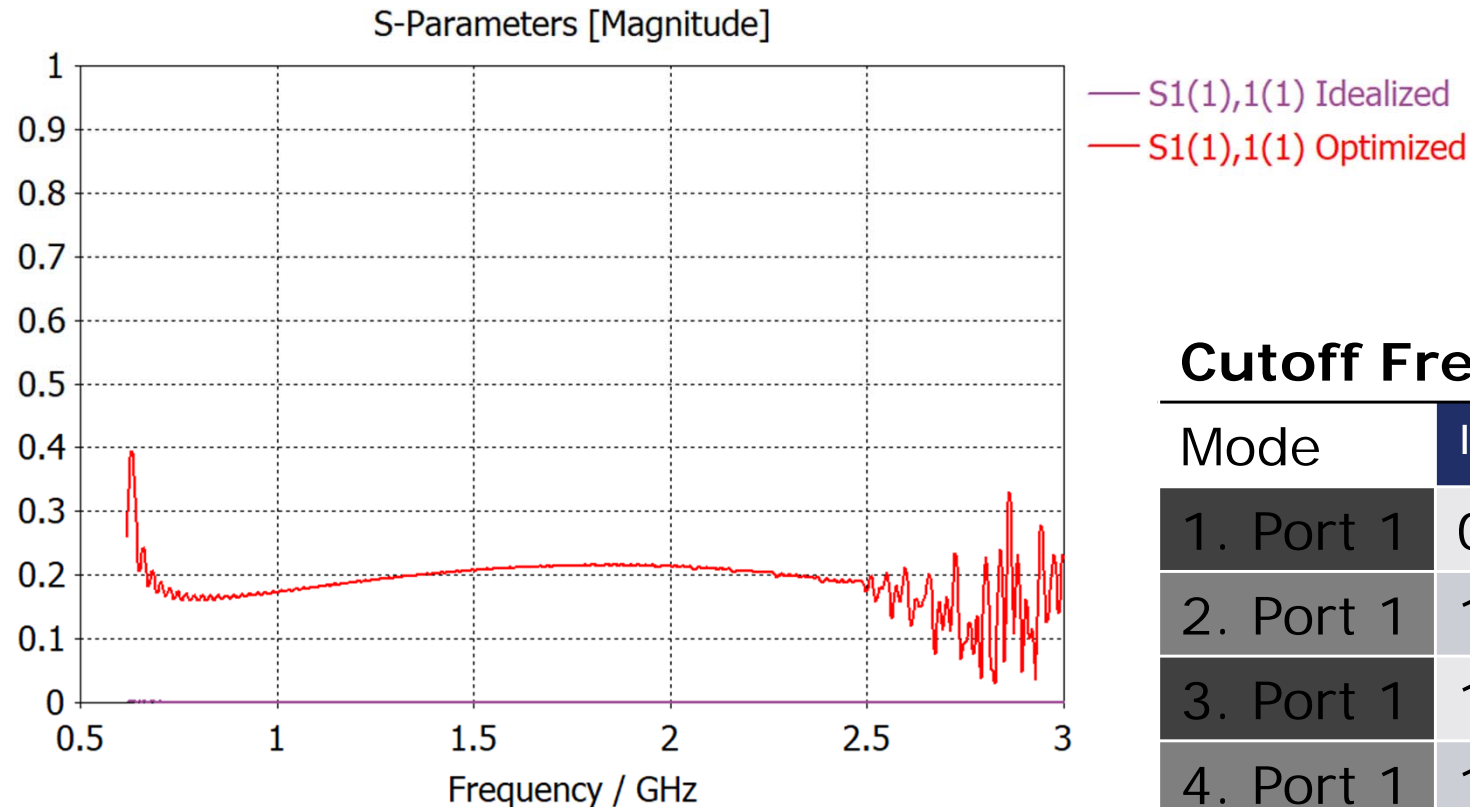
- Radius – 20.23 mm
- Height – 8.14 mm
- Distance from port to cylinder wall – 2.11 mm

# Comparison of the HOM Damper w/ and w/o Cylinder





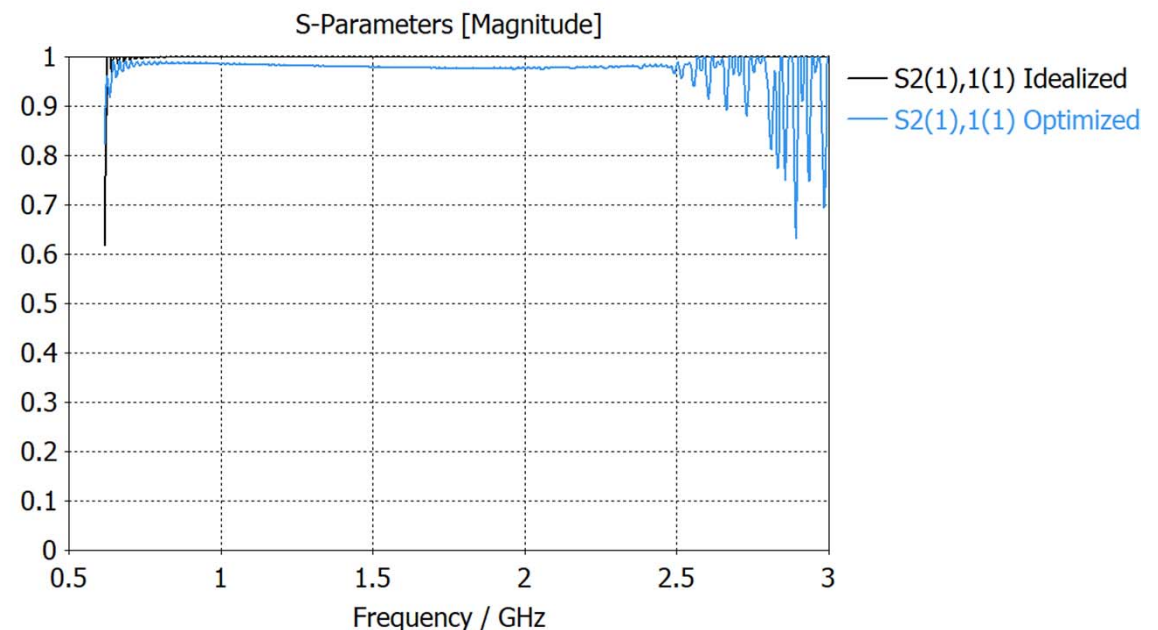
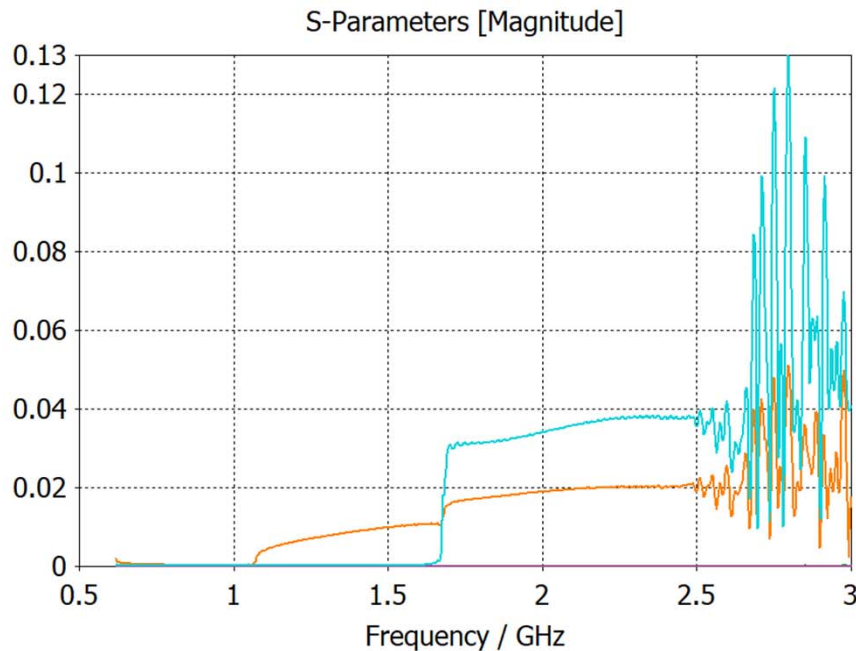
# Comparison of the HOM Damper w/ and w/o Cylinder



## Cutoff Frequency in GHz

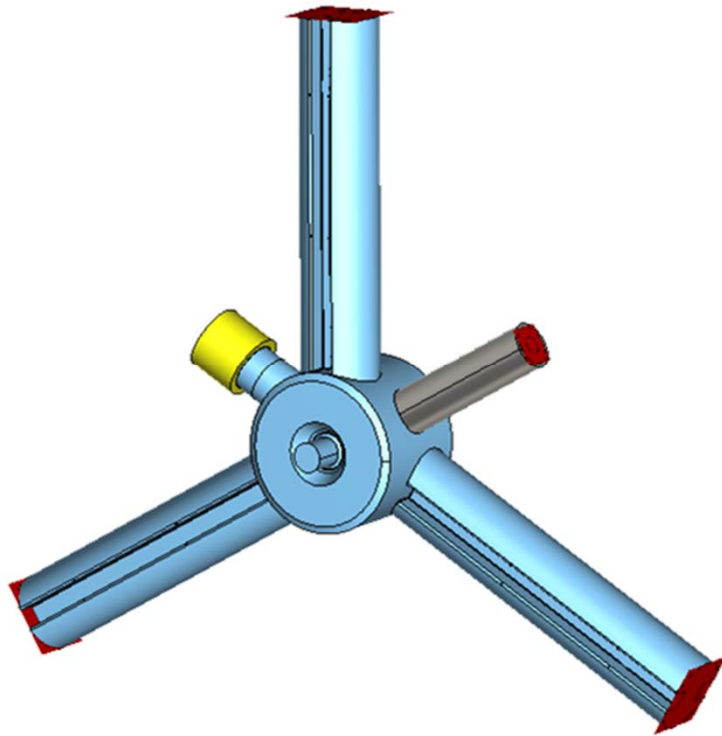
Mode	Idealized	Optimized
1. Port 1	0.61769	0.61765
2. Port 1	1.01762	1.01773
3. Port 1	1.06859	1.06868
4. Port 1	1.58156	1.58175
5. Port 1	1.67634	1.67645
1. Port 2	0.61770	0.61766

# Comparison of the HOM Damper w/ and w/o Cylinder



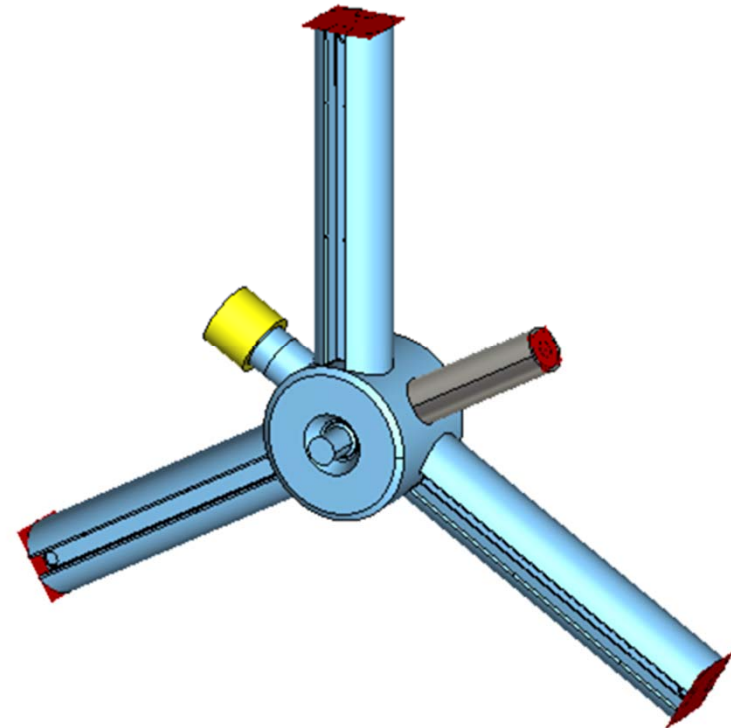
# Additional Simulation Effort

Simplified Cavity Model



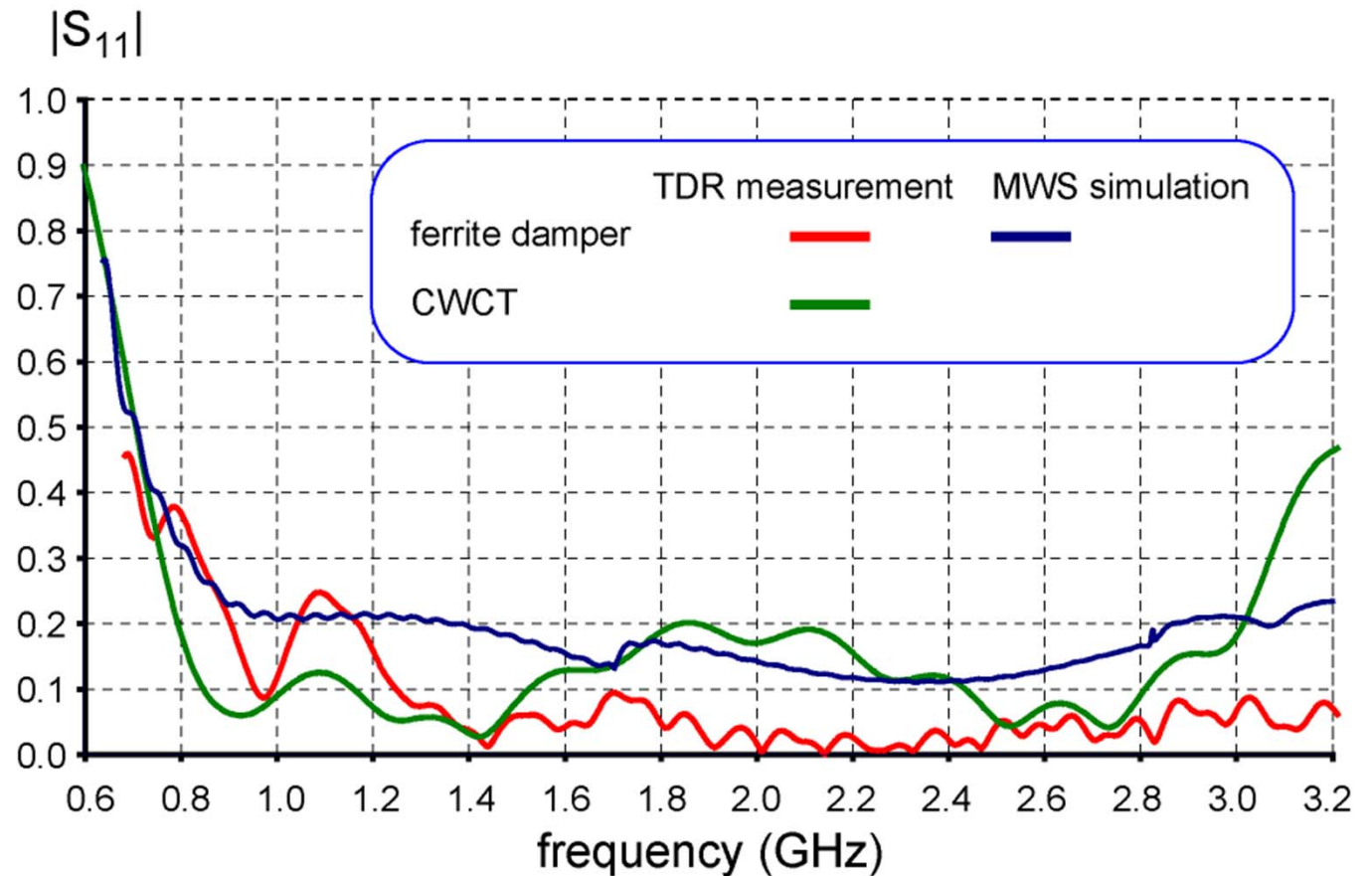
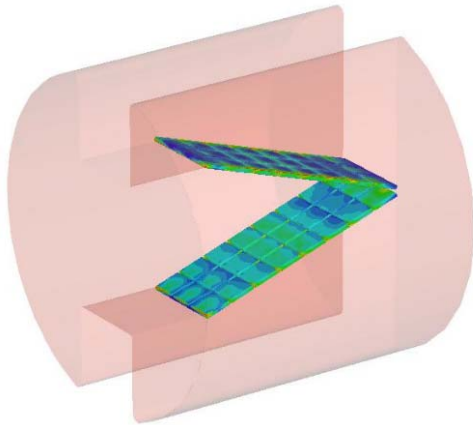
553,173 Tetrahedrons

Altered Simplified Cavity Model



554,644 Tetrahedrons

# Simulated Reflection Coefficient



Source: Presentation by Weihreter 2010-09-30 – The BESSY Higher Order Mode

# Conclusion and Outlook

- More Realistic Simulation Results
  - With little additional simulatory effort
- Possibly adding a second pair of cylinders to better reproduce the reflection parameter
- Verification by comparing to measurements needed



Thank you for your attention!