REFERENCE CAVITY BPM FOR LOW-Q IP-BPM

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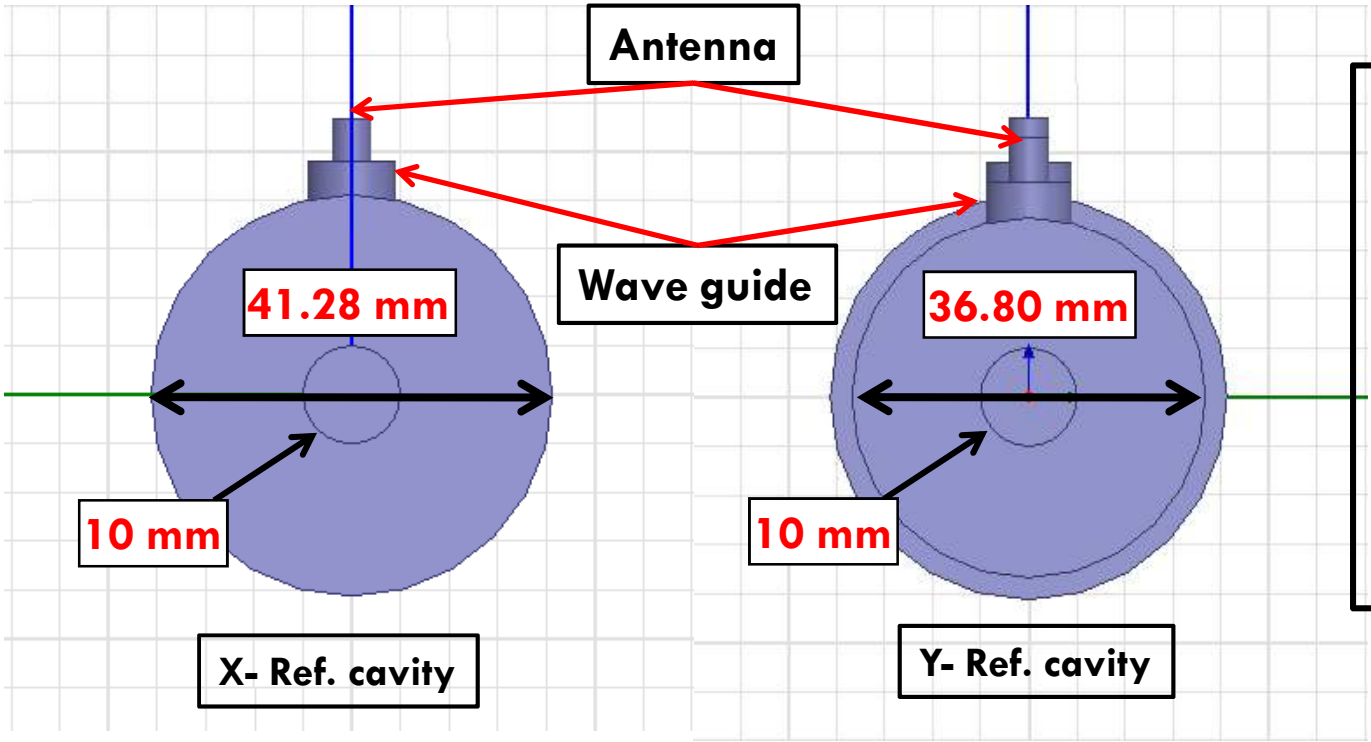
Current issue for Ref. cavity BPM

- Install location of Ref. cavity BPM
  - Wake field effect due to narrow beam pipe (6mm x12mm)
  - More similar decay time was need (below ~30ns)
  - Frequency tuning problem
- To solve these problems, Ref. cavity BPM design was modified.
  - Main modified point was material of Ref. cavity BPM
  - Material was changed Copper to Steel stainless

Reference cavity BPM design

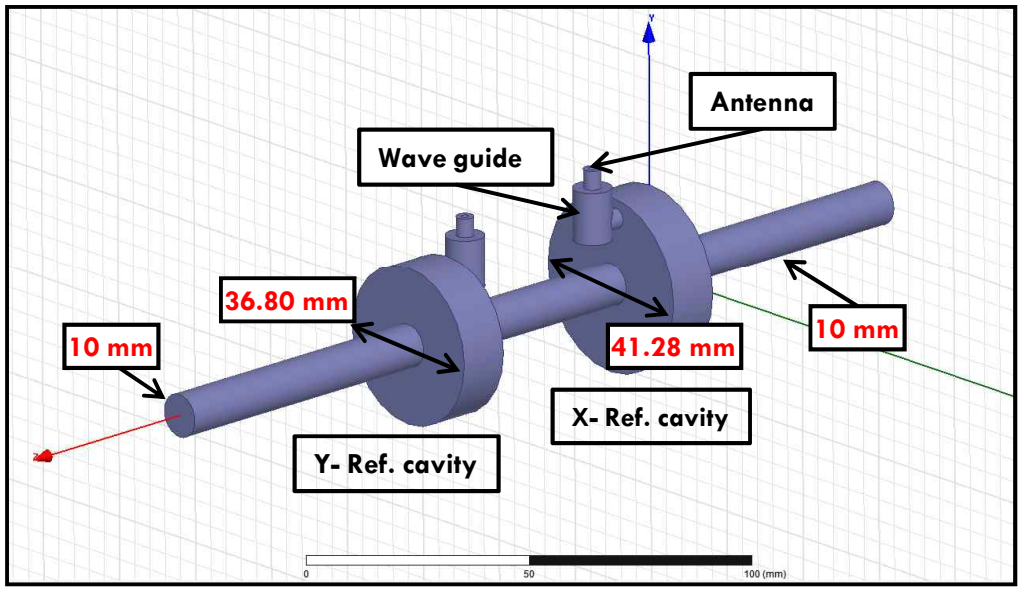
- **Reference cavity BPM drawings of HFSS**



Designed frequency
X-port: 5.703 GHz
Y- port: 6.410 GHz
Cavity size :
41.28mm,36.80mm
Beam Pipe radius:
5mm (circular pipe)
Material of BPM:
Steel Stainless

Reference cavity BPM design

- Cavity shape for HFSS simulation



- Cavity size : 41.28mm,36.80mm
- Beam Pipe radius: 5mm (circular pipe)
- Material of BPM: Steel Stainless

- HFSS simulation need more optimization.

Port	f_0 (GHz)	β	Q_0	Q_{ext}	Q_L	τ (ns)
X-port	5.7034	0.0208	1164.43	55915.7	1140.68	31.83
Y-port	6.4100	0.0327	1203.61	36765.1	1165.46	28.94

Further works for Low-Q IP-BPM

- How to do frequency tuning for SUS Ref. cavity BPM
  - Because, SUS material shape can't changed easily.
- Ref. cavity BPM wake field effects estimation
- Simulation of DAQ with 100MHz digitizer (SIS3301) and integrated ADCs
  - Now, we are on the preparation to buy more higher sampling frequency ADC digitizer for 250MHz, it corresponding to 1sample/4ns sampling speed.