

Q-BPM development plan

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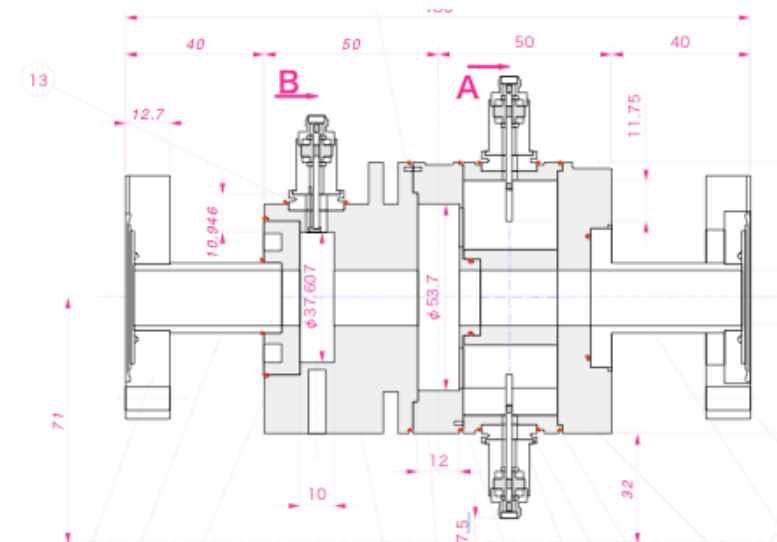
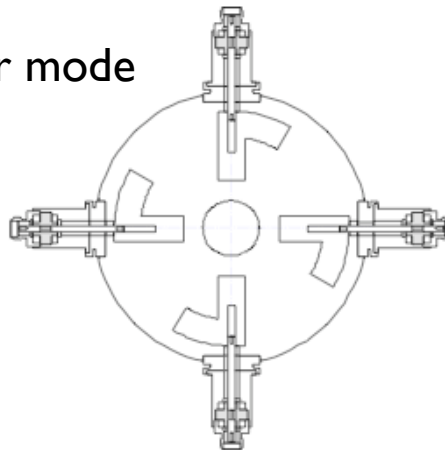
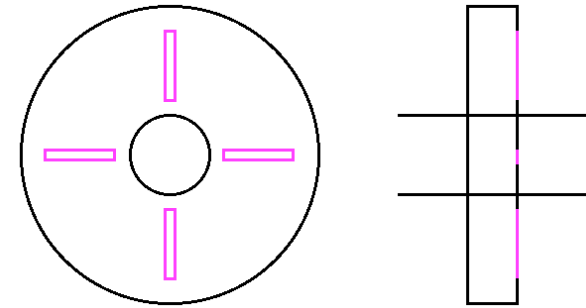
13 Apr. /05

ILC WG4 meeting

- Existing BPM
- Design strategy
- What need to be done
- Schedule

Existing Cavity BPM

- Basic design (same as BINP's and SLAC's(X-band))
 - pill-box cavity, use TMI 10
 - slot magnetic coupling
 - 4-ports output (BINP's has 2-ports)
- design of KEK cavity
 - wave guide was bent to make it compact
 - each sensor has a reference cavity
 - wider coupling slot to have bigger signal
- problems in KEK cavity
 - output power is much smaller than expected (factor 7).
 - coupling to the antenna
 - poor x-y isolation (20dB).
 - wave guide affects the sensor mode

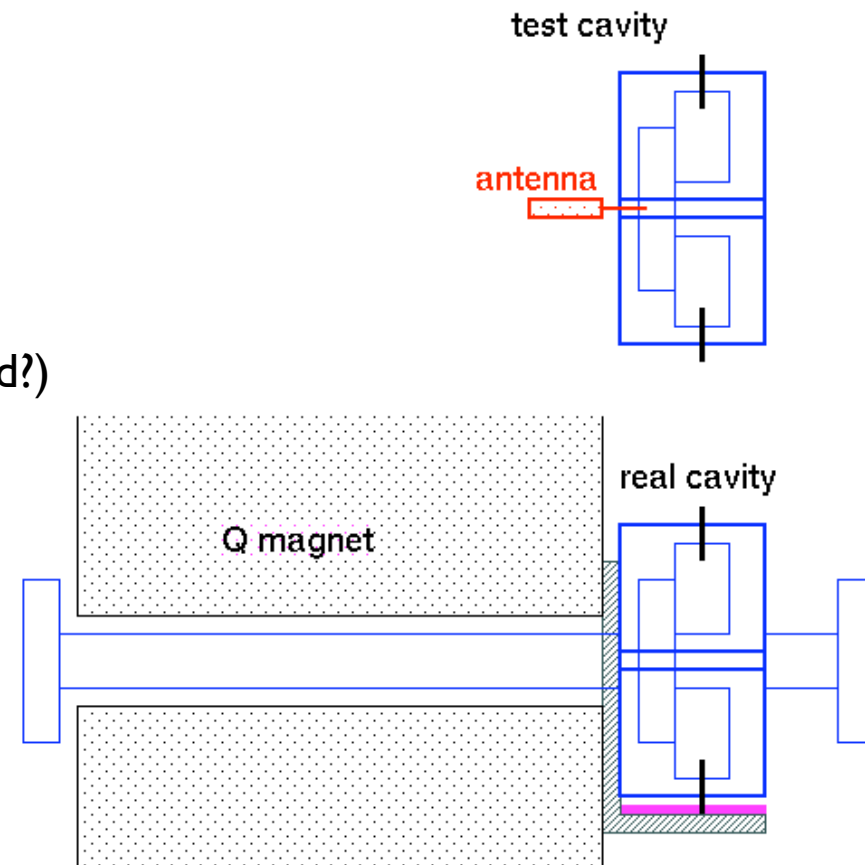


Design strategy

- Keep the basic design
 - pill-box
 - slot magnetic coupling
 - 4-ports
- Need to be changed
 - wave guide shape to be simple
 - antenna geometry to have stronger coupling
- Modification
 - decay time by the slot width (optimize for the SLAC electronics)
 - enlarge the beam pipe radius
- Option
 - not to have a reference cavity for each sensor (reduce cost)
 - introduce an x-y frequency difference to improve isolation

To do

- Cavity design
 - RF simulation (HFSS, MAFIA)
 - considering how to fabricate
 - discussion with mechanical center people
- Test cavity
 - fabricate in KEK machine center to quickly test the design
 - fabricate in PAL, and check the quality
- Test at bench (antenna)
 - electrical center, power output
- Test with beam
 - use test cavity with a vacuum vessel. (at ATF linac end?)
 - check beam response
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- Real cavity
 - beam pipes are attached, vacuum tight
 - antenna test is difficult
 - only port-port measurement is possible



Schedule

