
Status of BPMs and Electronics System at KNU.

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Kyungpook national university

17, March, 2008

Outline

1. Introduction. (BPM group and facility in KNU)
2. Status of Low-Q IP-BPM.
3. Status of S-band BPM.
4. Time table of future work.

Introduction

1. Member of KNU BPM group

E-S Kim : Leader.

H-S Kim : Fabrication of IP-BPM and S-band BPM. (0.5)

S-H Shin : Design and fabrication of IP-BPM and S-band BPM.
Beam test for IP-BPM. (1, Post-doc.)

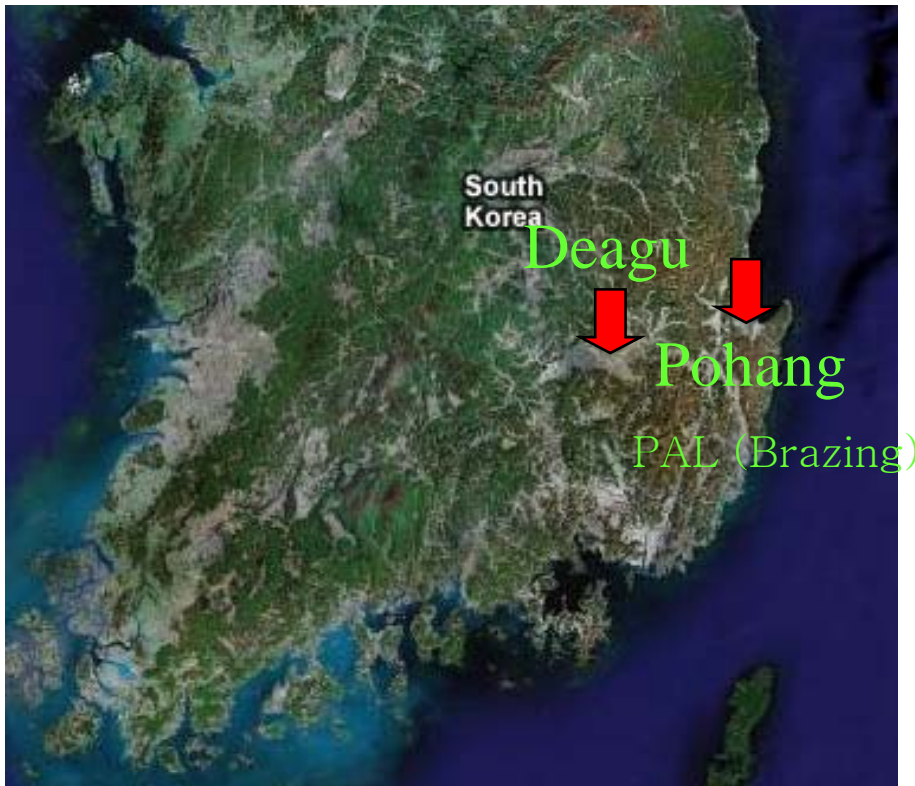
E-Y Heo : Design and fabrication of S-band BPM. (1, Graduate student)

W-J Jung : New post-doc. from July 2008.

Introduction

2. Overview of facility

Korea



Deagu



Introduction



GNU



Science Hall 1
Cavity BPM design

Techno Park
Electronics design

College of Engineering Bldg. 3
Cavity BPM Fabrication

College of Engineering Bldg. 10
Electronics Fabrication
RF measurement



Introduction

Fabrication facility in College of Engineering Bldg. 3



High accuracy & express machine

High accuracy & discharge machine

Machining center 6

Machining center 4

C.N.C Milling

C.N.C Tuning Machine

Tuning Machine

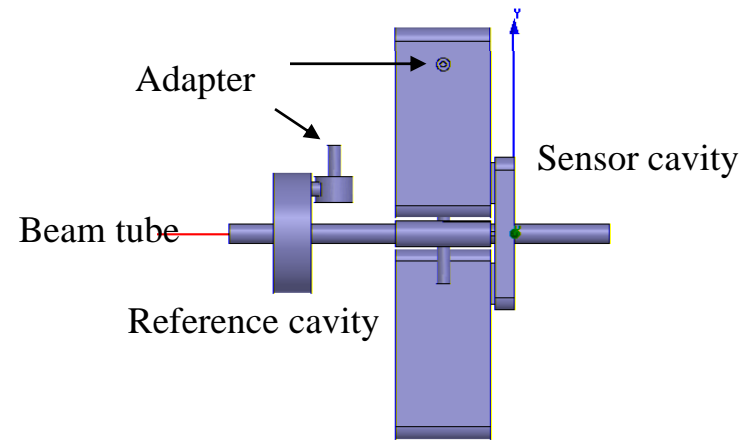
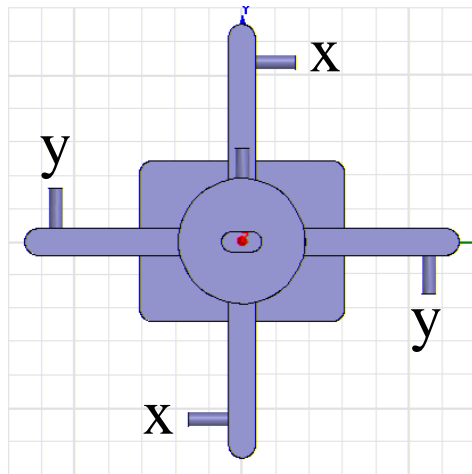
Milling Machine

Drilling Machine

Etc.

Status of Low-Q IP-BPM

1. Design



⇒ Basic idea is same with ATF IP-BPM.

⇒ Larger coupling slot dimension is considered to decrease signal decay time

for sensor cavity.

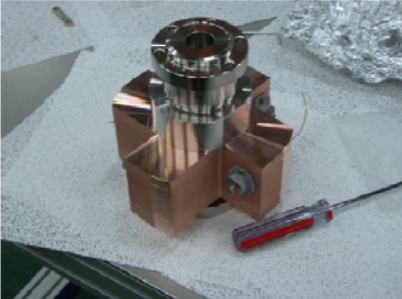
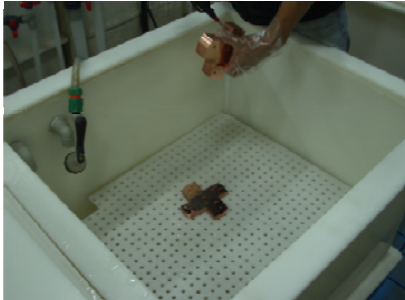
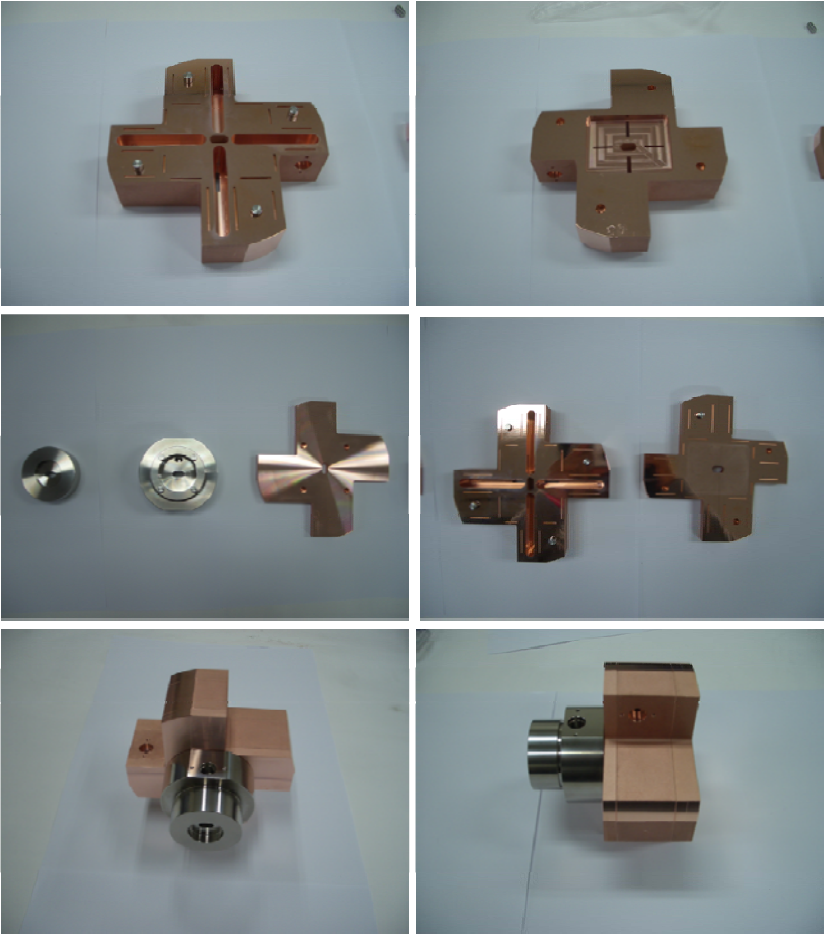
⇒ Stainless steel as cavity material is considered to decrease signal decay time

for reference cavity.

⇒ Signal decay times for sensor (x and y) and reference signals are
~ 20 and ~ 30 ns, respectively.

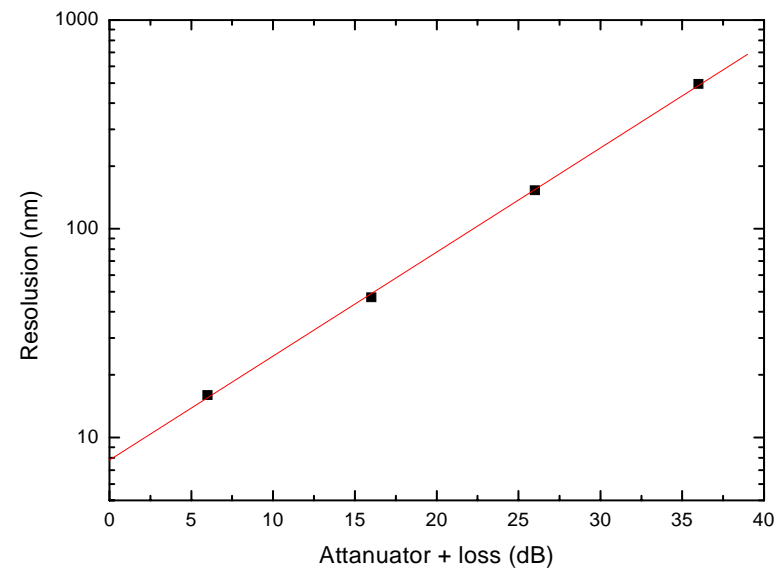
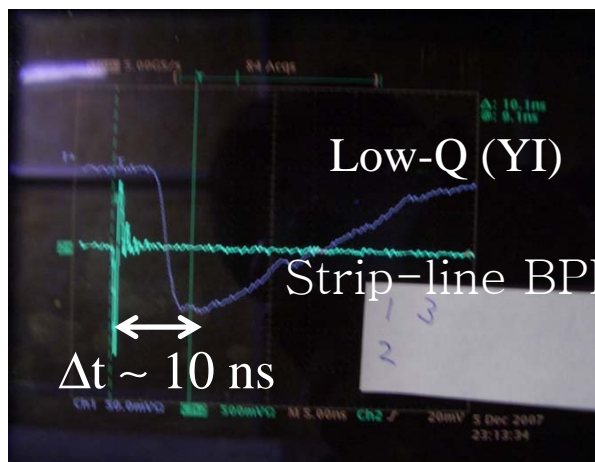
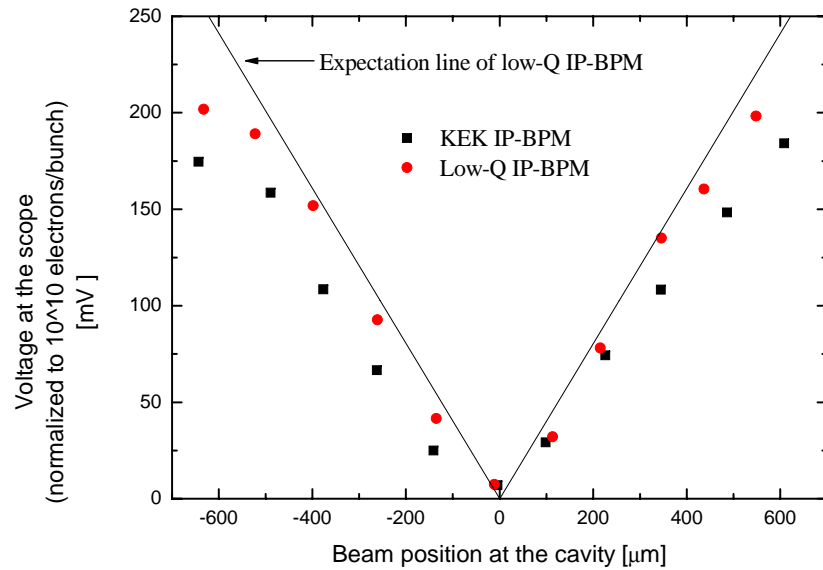
Status of Low-Q IP-BPM

2. Fabrication



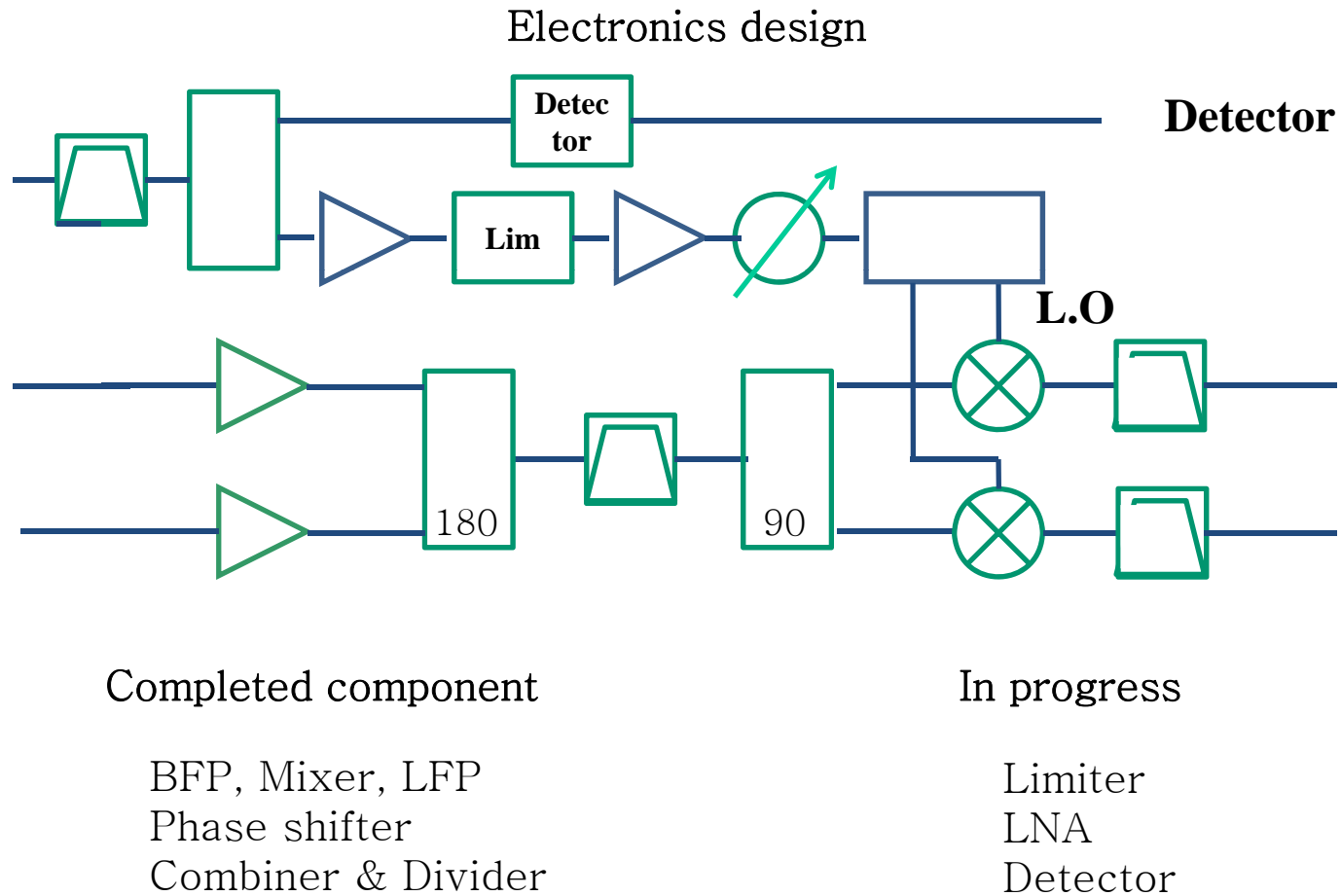
Status of Low-Q IP-BPM

3. Basic beam test

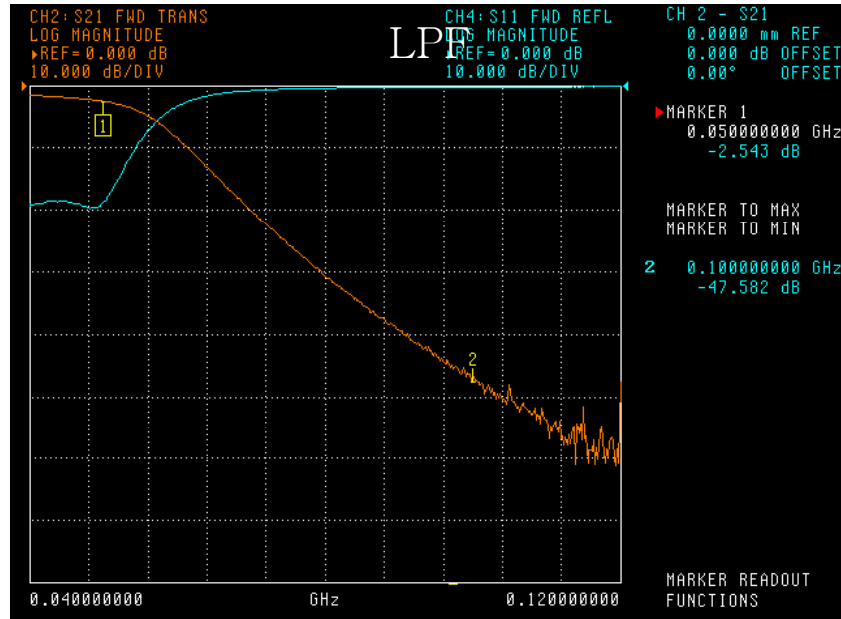
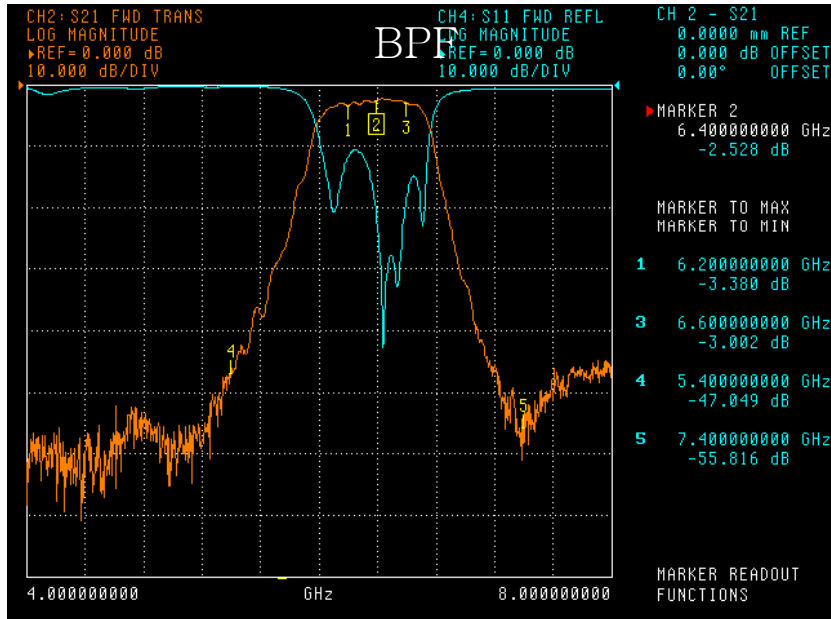
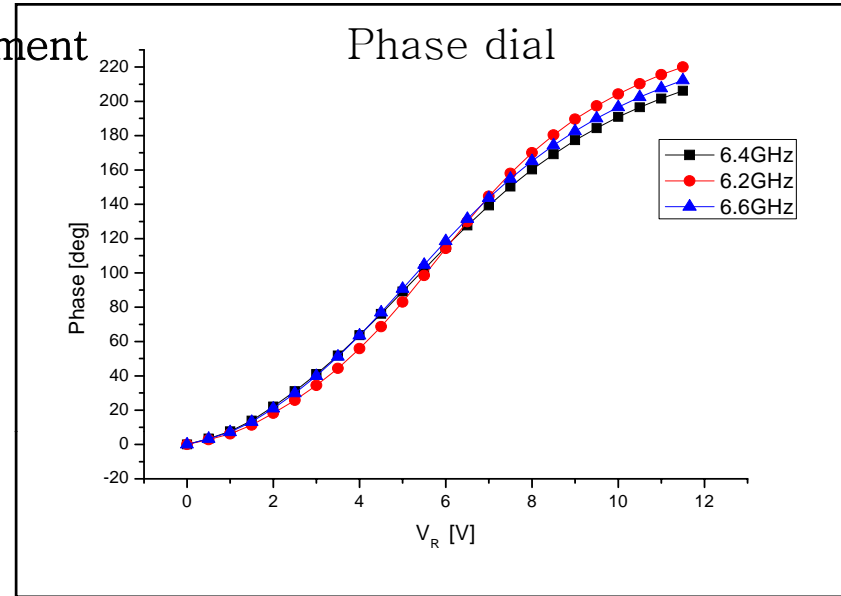
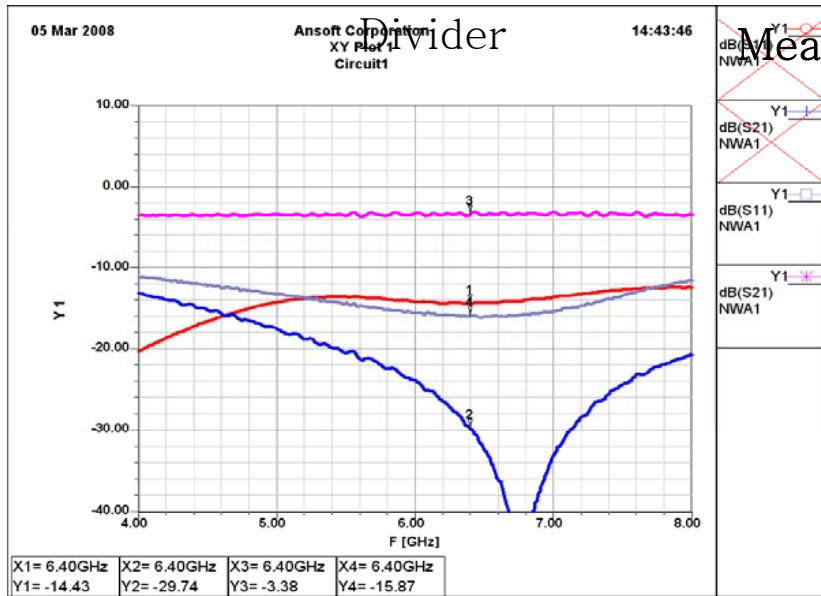


Status of Low-Q IP-BPM

4. Recent progress (Electronics)



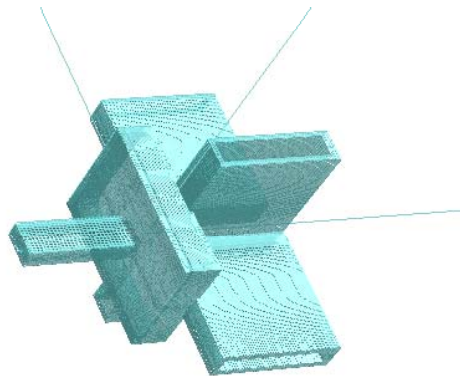
Status of Low-Q IP-BPM



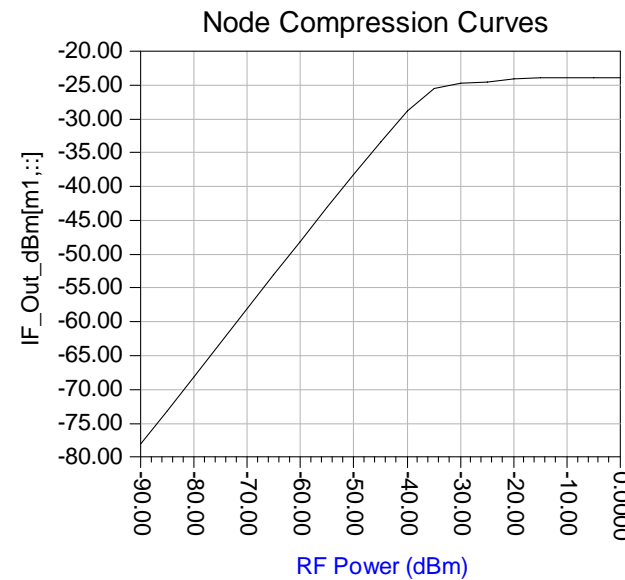
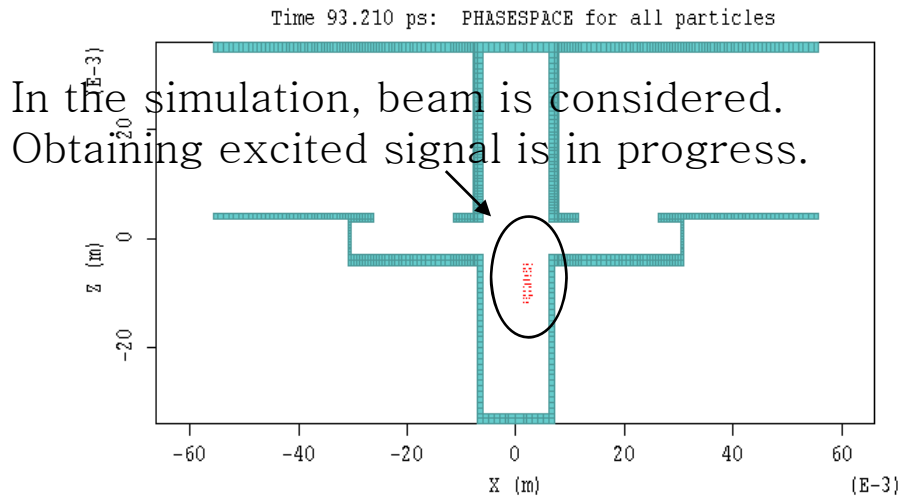
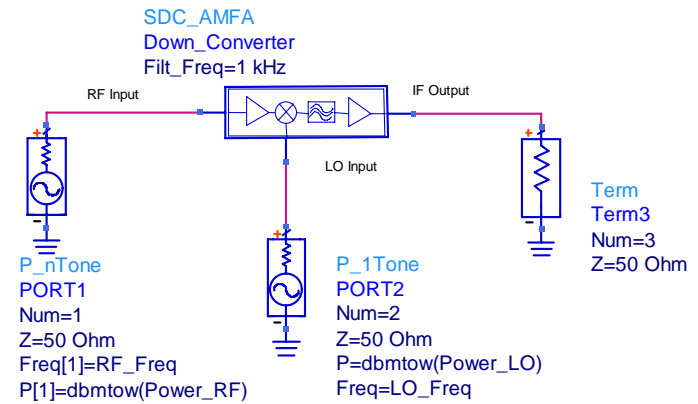
Status of Low-Q IP-BPM

5. Study in progress (Magic and ADS)

Magic simulation



ADS simulation



Surface at I2=74 (0.000 m)	Author: Seunghwan Shin
Remarks: IP_BPM	KNU
	Device: Cavity BPM
	File: IPCavityBPM new 1.m3d
MAGIC3D, Double Version: 7.30, August 11 2004	Date: Mar 14, 2008
	Time: 19:24
	Page: 32

Status of S-band BPM

1. Design

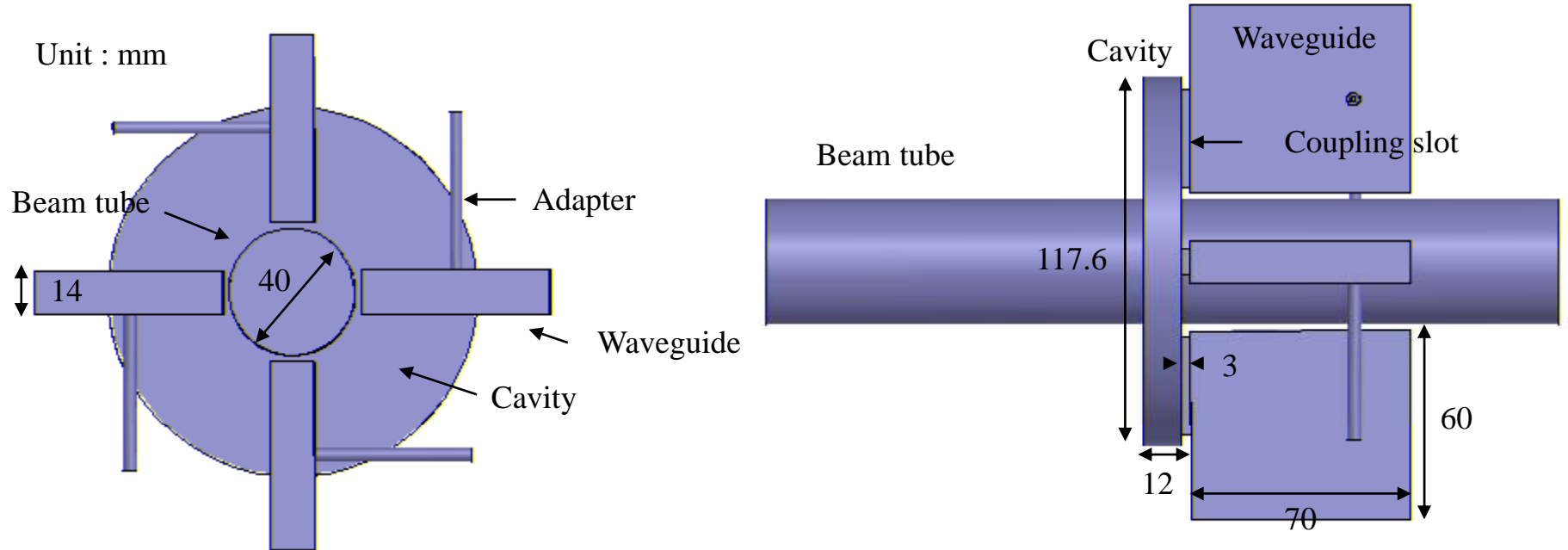
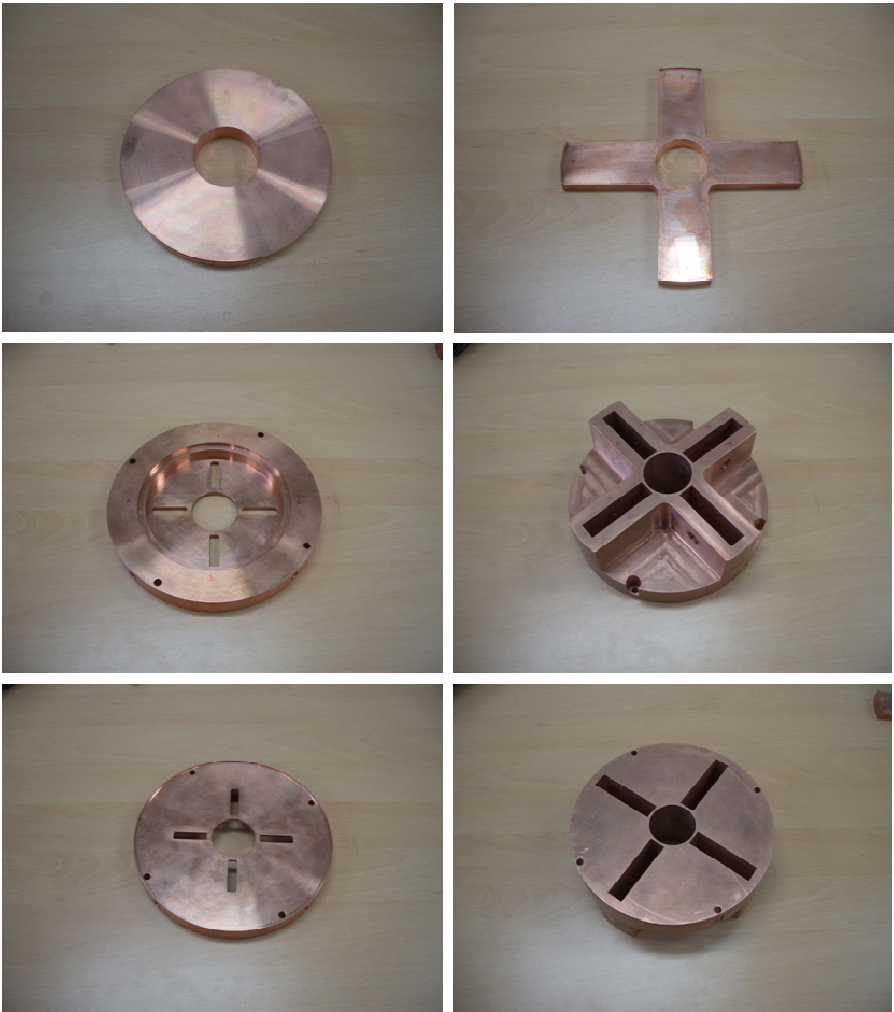
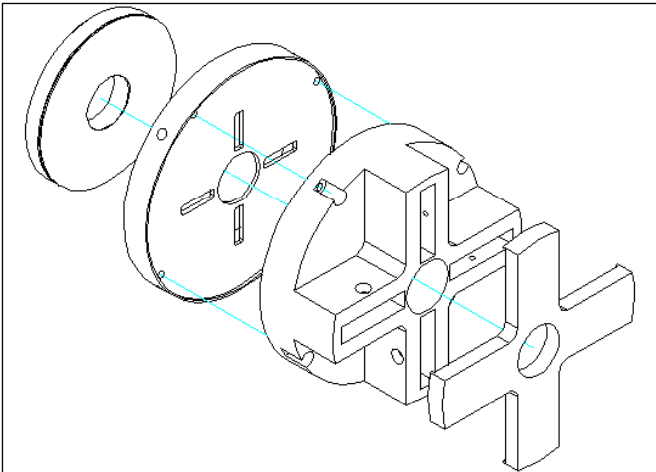
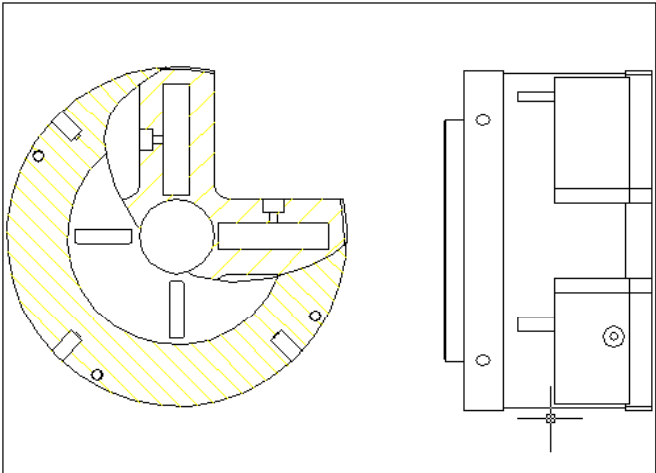


TABLE Design value.

Mode	f (GHz)	Q_0	β	Q_{ext}
Dipole	2.878	5075	6.8	750

Status of S-band BPM

2. Fabrication



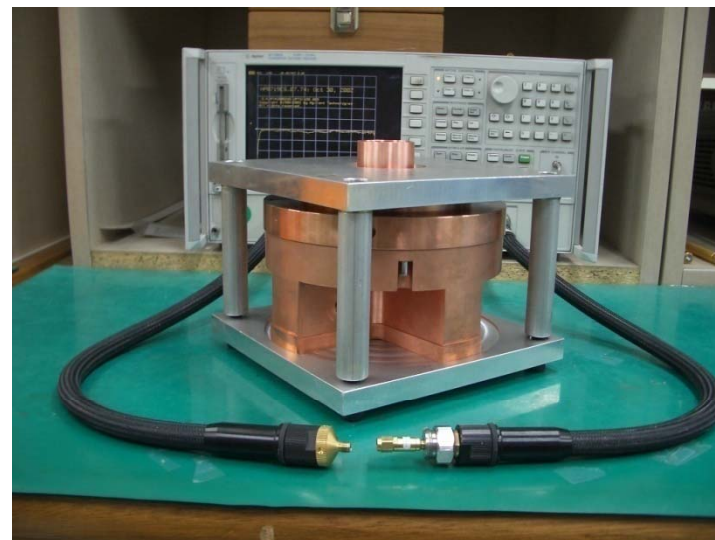
Status of S-band BPM

3. Measurements

CMM



RF measurement



Fabrication accuracy

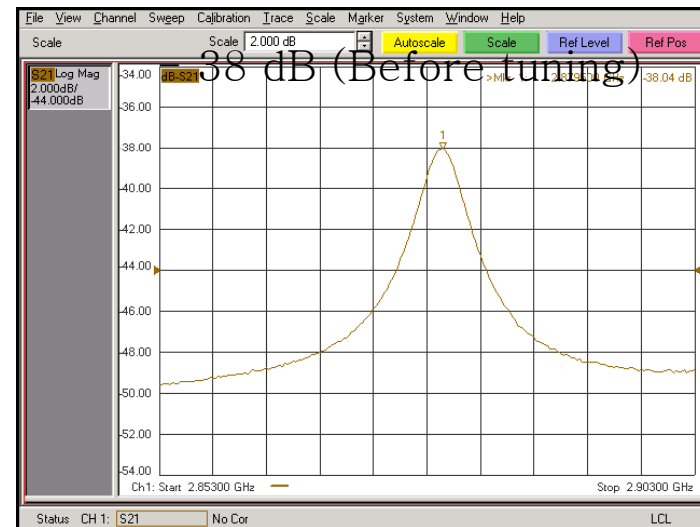
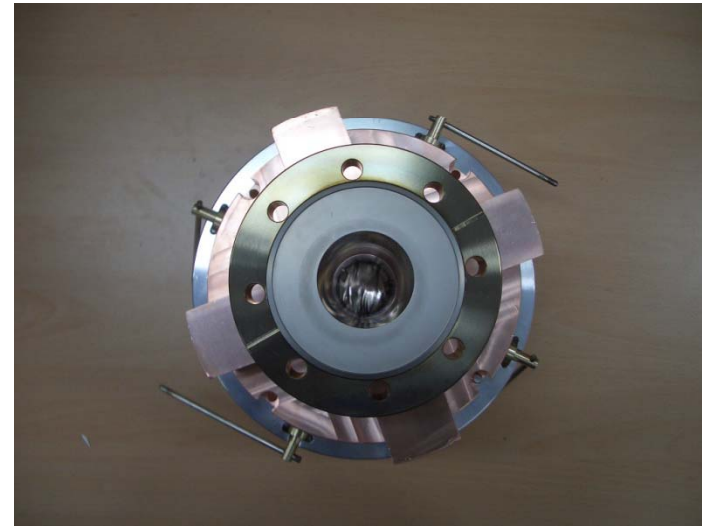
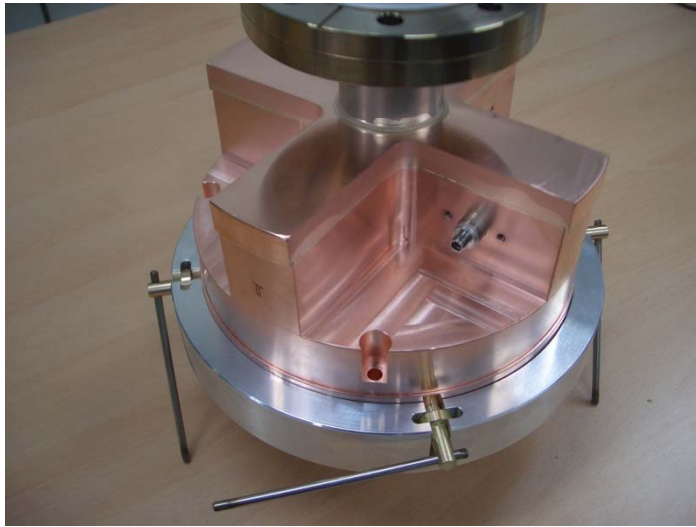
- Beam tube <math>< 160 \mu\text{m}</math>
- Coupling slot <math>< 50 \mu\text{m}</math>
- Other part <math>< 50 \mu\text{m}</math>

TABLE RF measurement.

	f (GHz)	Q_0	β	Q_{ext}
Des	2.878	5075	6.8	750
X12	2.878	2389	3.1	766
Y12	2.878	2057	2.7	774

Status of S-band BPM

XY isolation



Time table of future work

	March		April				May				June			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4
IP-BPM	→ Fabrication & RF measurement of electronics						→ Beam test with fabricated electronics							
S-band BPM	→	Summary of cold model					→ Fabrication of hot model (5 sets)				→ Brazing & RF test (1 set)			
							→ Modification (4 sets)				→ Brazing & RF test (4 sets)			