Superconducting Cavity for KEKB

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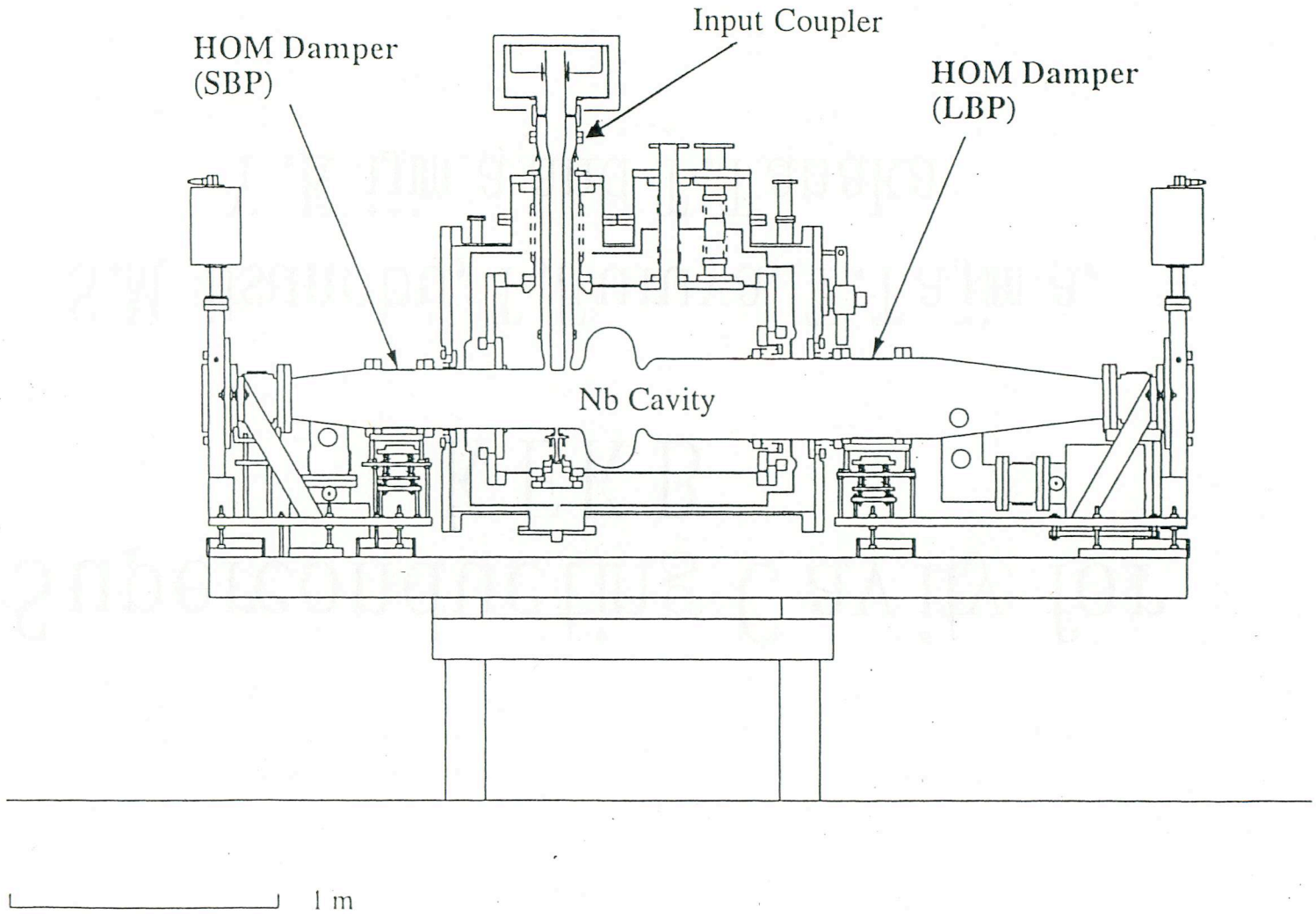
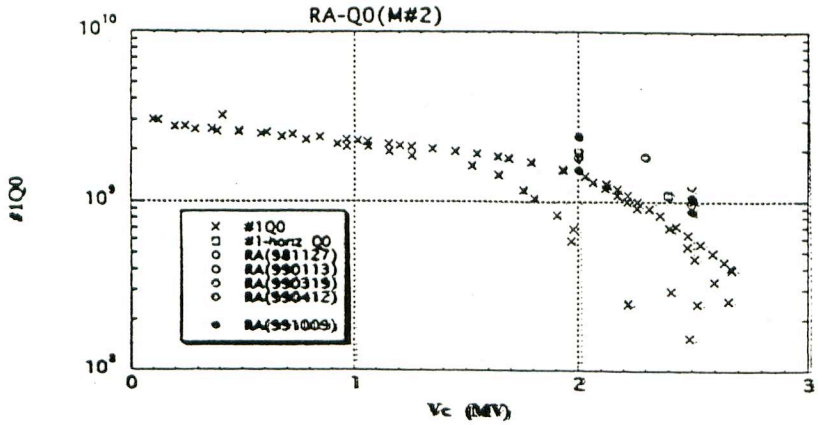
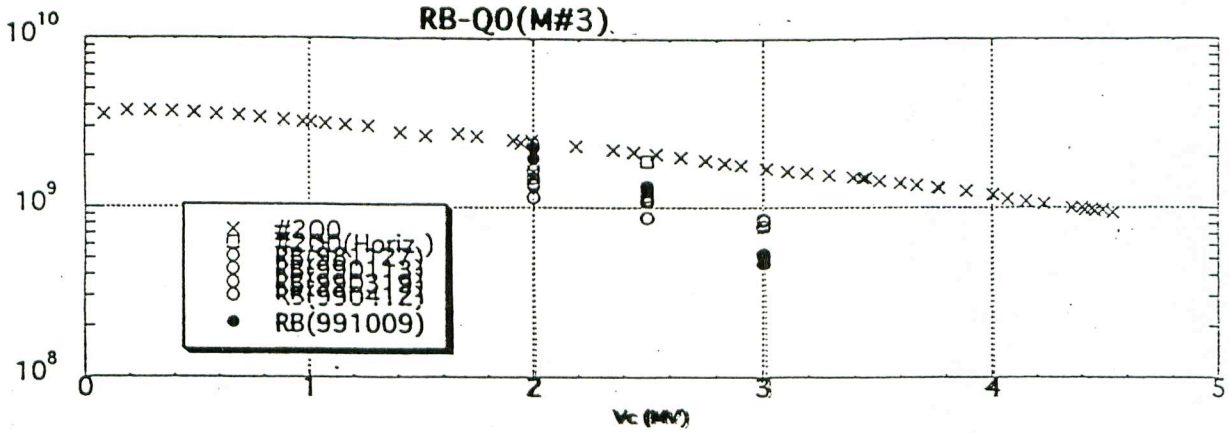
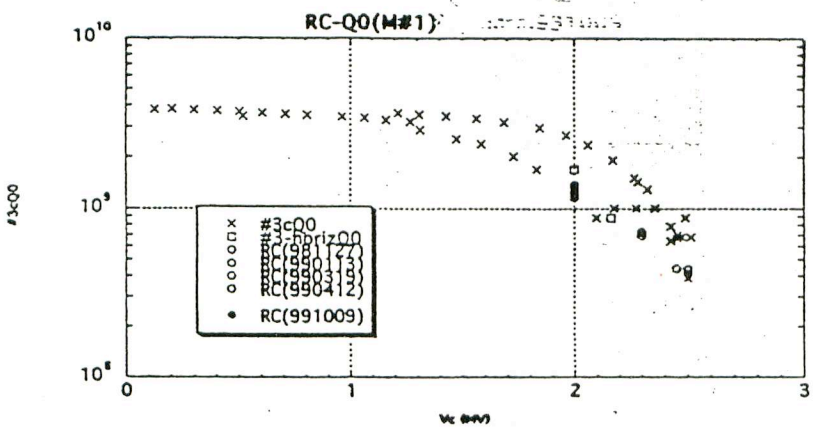
Y.Kijima and T.Tanaka

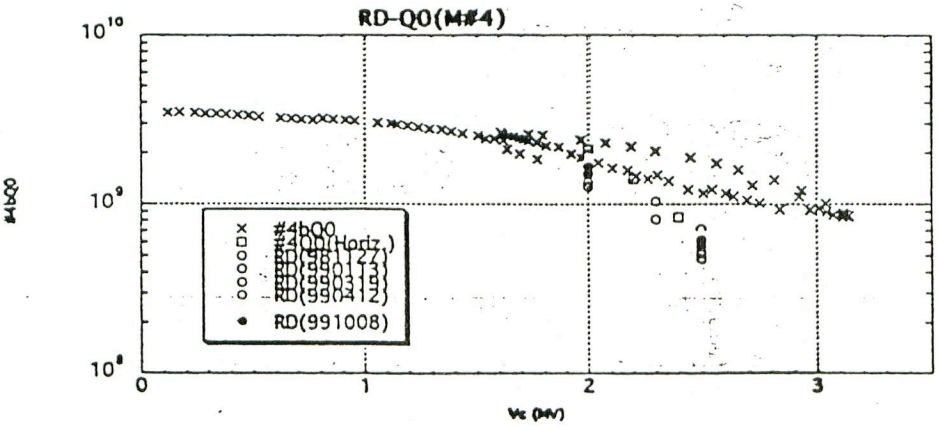
Superconducting Cavity Module for KEKB HER




RA-Q0(M#2)
#1Q0
Vc (MV)
#1Q0
#1-horiz Q0
RA(981127)
RA(990113)
RA(990319)
RA(990412)
RA(991009)

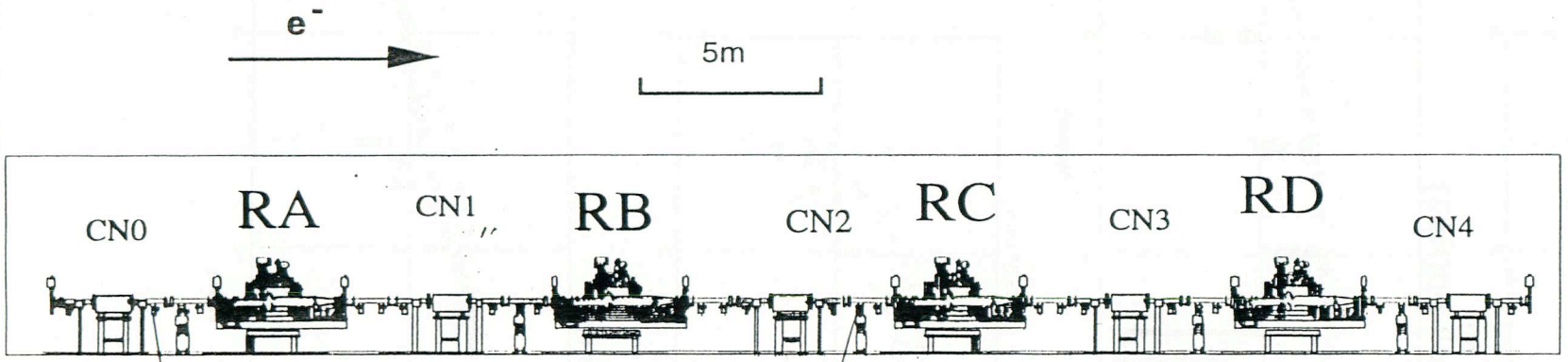

RB-Q0(M#3)
Vc (MV)
#2Q0
#2Q0(Horiz.)
RB(991009)


RC-Q0(M#1)
#3cQ0
#3-horizQ0
RC(991009)

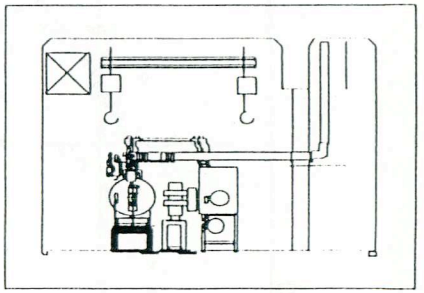

RD-Q0(M#4)
#4bQ0
Vc (MV)
#4bQ0
#4bQ0(Horiz.)
RD(991008)

Cavity Train and NEG Pumps

Side View



Cross Section



NEG 400L/s
Effective pump speed
~77 L/s.m

Neighbor duct

- IP x1
- CCG x2
- Pirani x1
- ICF152 valve x1

Cavity

- IP x2
- CCG x2
- Metal gauge x1
- Pirani x1
- Convectron gauge x1
- Cavity Safety valve x1
- ICF70 All Metal Valve x3

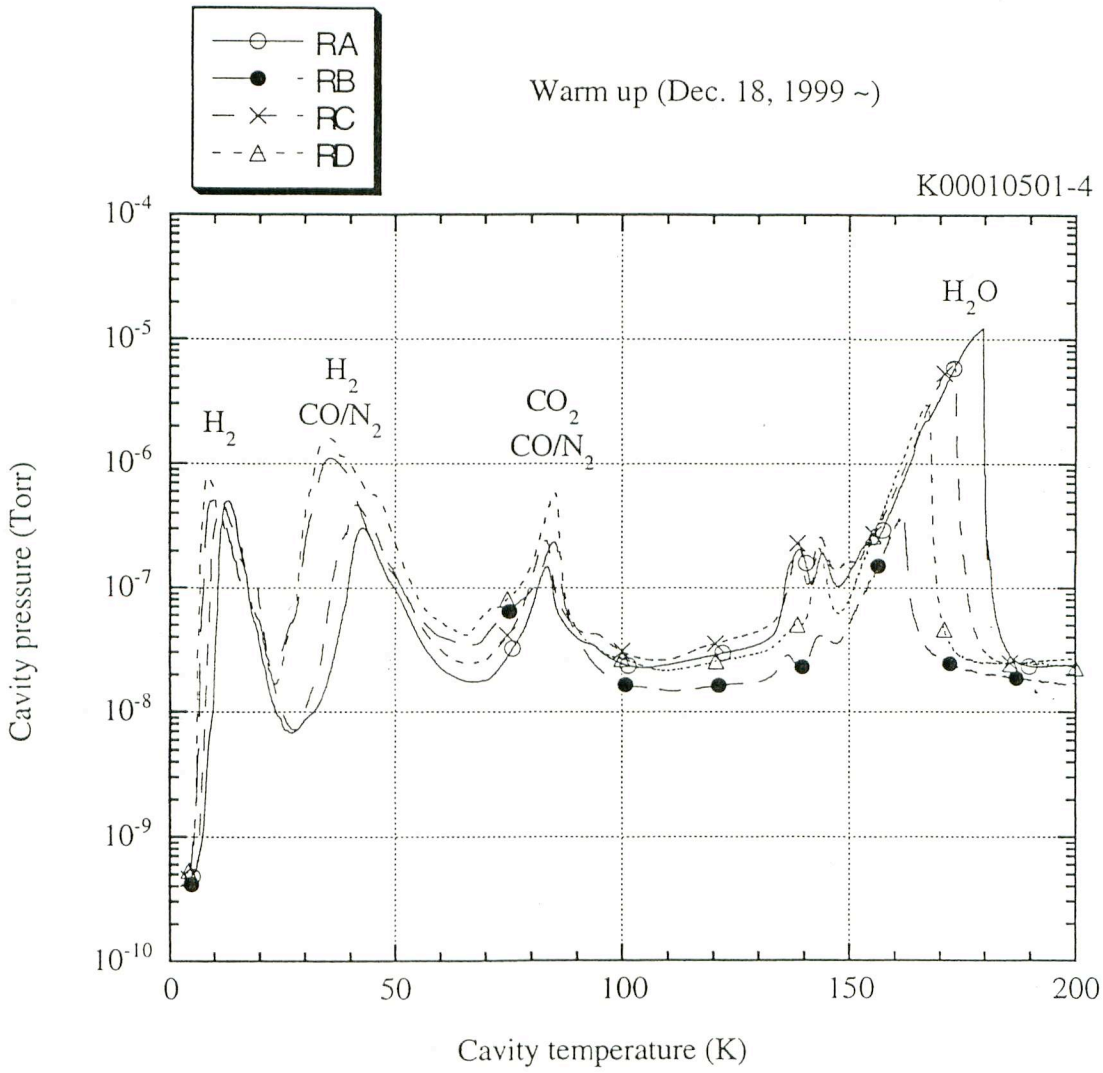


Fig.: Pressure as a function of cavity temperature upon warm-up of the cavities.

Table : Total amount of desorbed gases during warm up on Dec. 18, 1999.

Cavity name	Pressure integral [Torr·sec]	Total desorbed gas*1 [Torr·L]
RA	0.10298	30.0
RB	0.0095815	2.79
RC	0.066766	19.4
RD	0.033672	9.80

*1Effective pumping speed of 291 L/s was multiplied with pressure integral.

Table : Comparison of cavity pressures after beam run and cool-down.

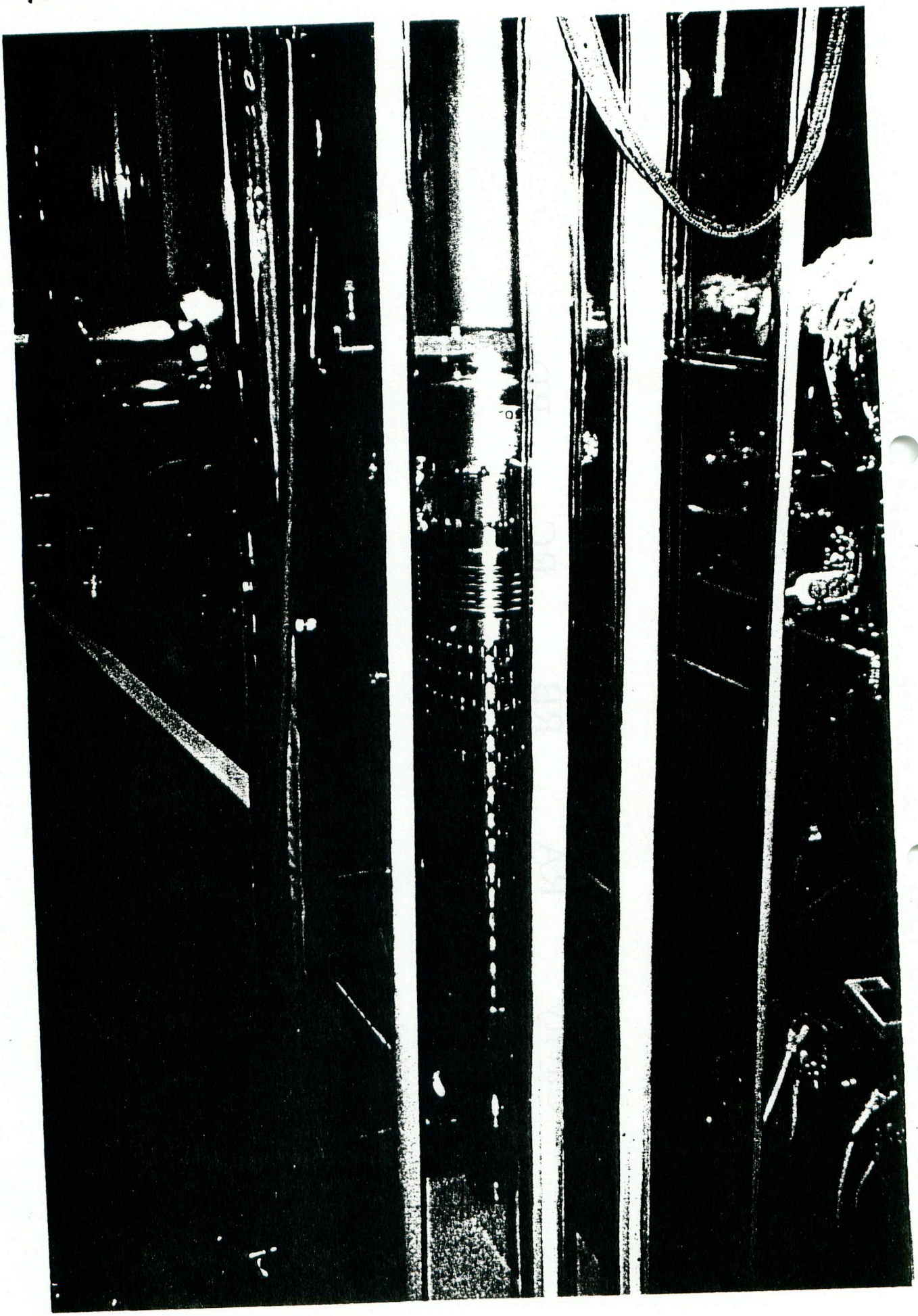
Name of cavity	Pressure right before cool-down ($x10^{-10}$ Torr)*1	Pressure after re-cooldown to 4.2 K ($x10^{-10}$ Torr)
RA	4.7	2.7
RB	3.7	1.6
RC	4.6	2.5
RD	5.1	2.7
AR-cavity (1st test)	13	2.7

*1No beam, before warm-up of KEKB cavities (on Dec. 18, 1999), and of AR cavity (Mar. 30, 1996) after frequent trips. KEKB cavities have not had frequent trips.

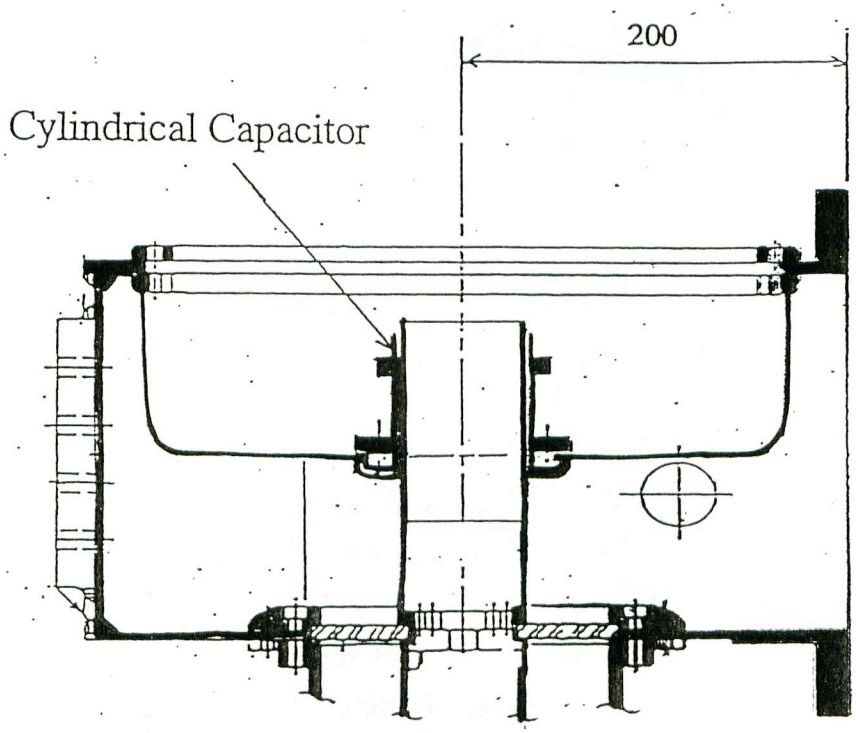
Q_0,Eacc,max and static loss

Cavity Name	RA	RB	RC	RD
$Q_{0\ \text{at}\ 2MV}$	2.4E9	2.0E9	1.2E9	1.5E9
8MV/m) $E_{acc,Max}$ (MV/m)	12.0	12.8	11.0	11.1
Static Loss(W)	70	26	25	27

KEK INPUT COUPLER



Biased Type Doorknob Transition for KEKB SC cavity



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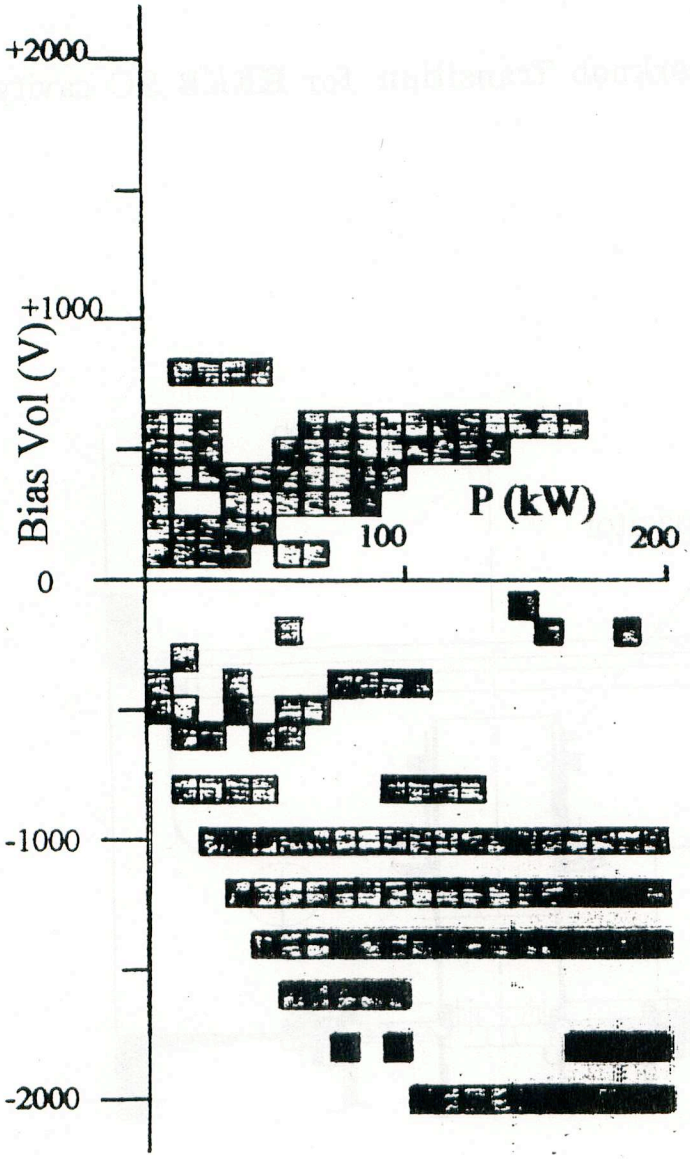
Cavity

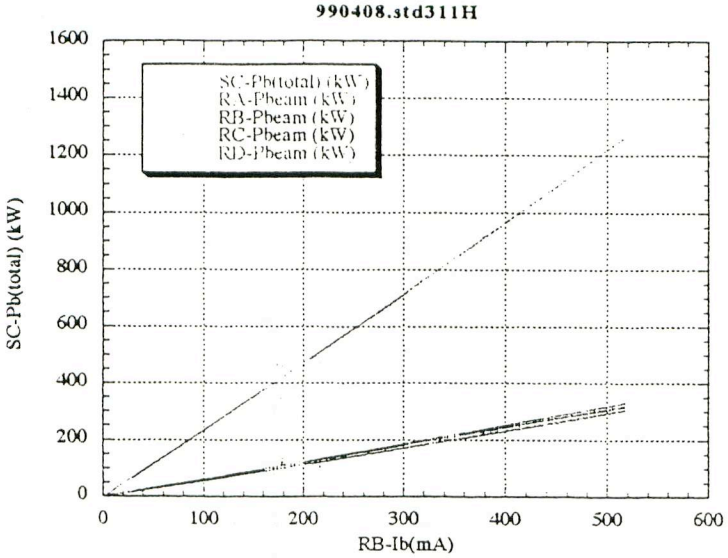
(KEK, S.Mitsunobu et al)

Multipactor Map with DC Bias



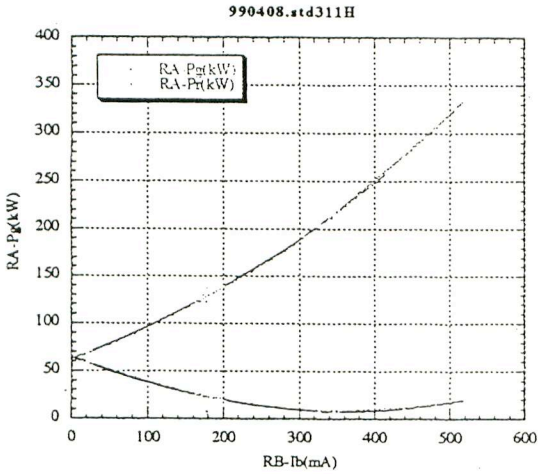
KEKB-SC P(in), P(ref) & P(beam), 990408

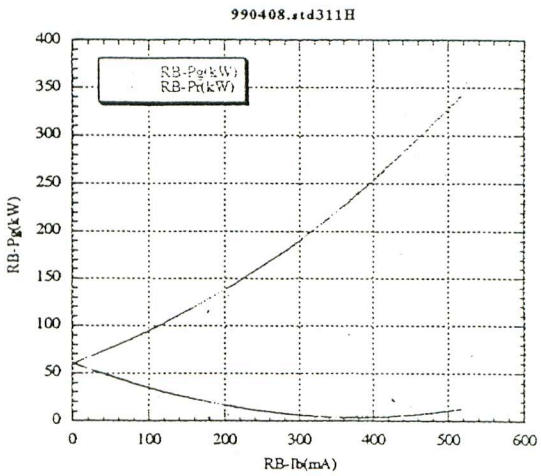
T. Furuya

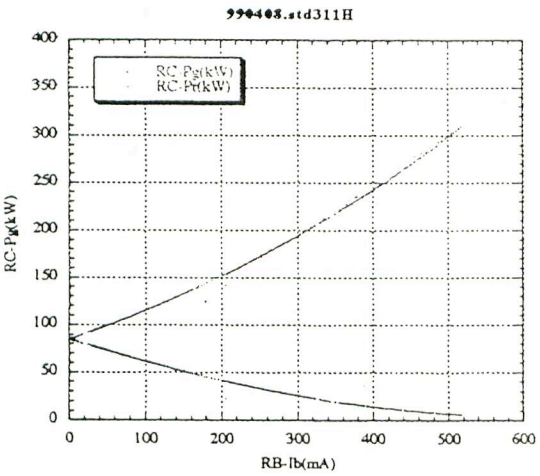


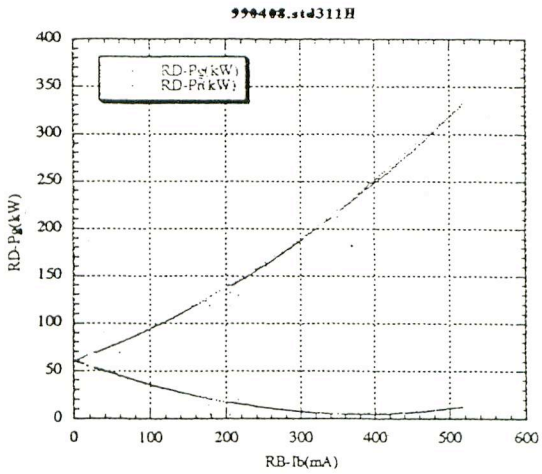
Vc = 1.45MV/eavity

offset = -5 deg.

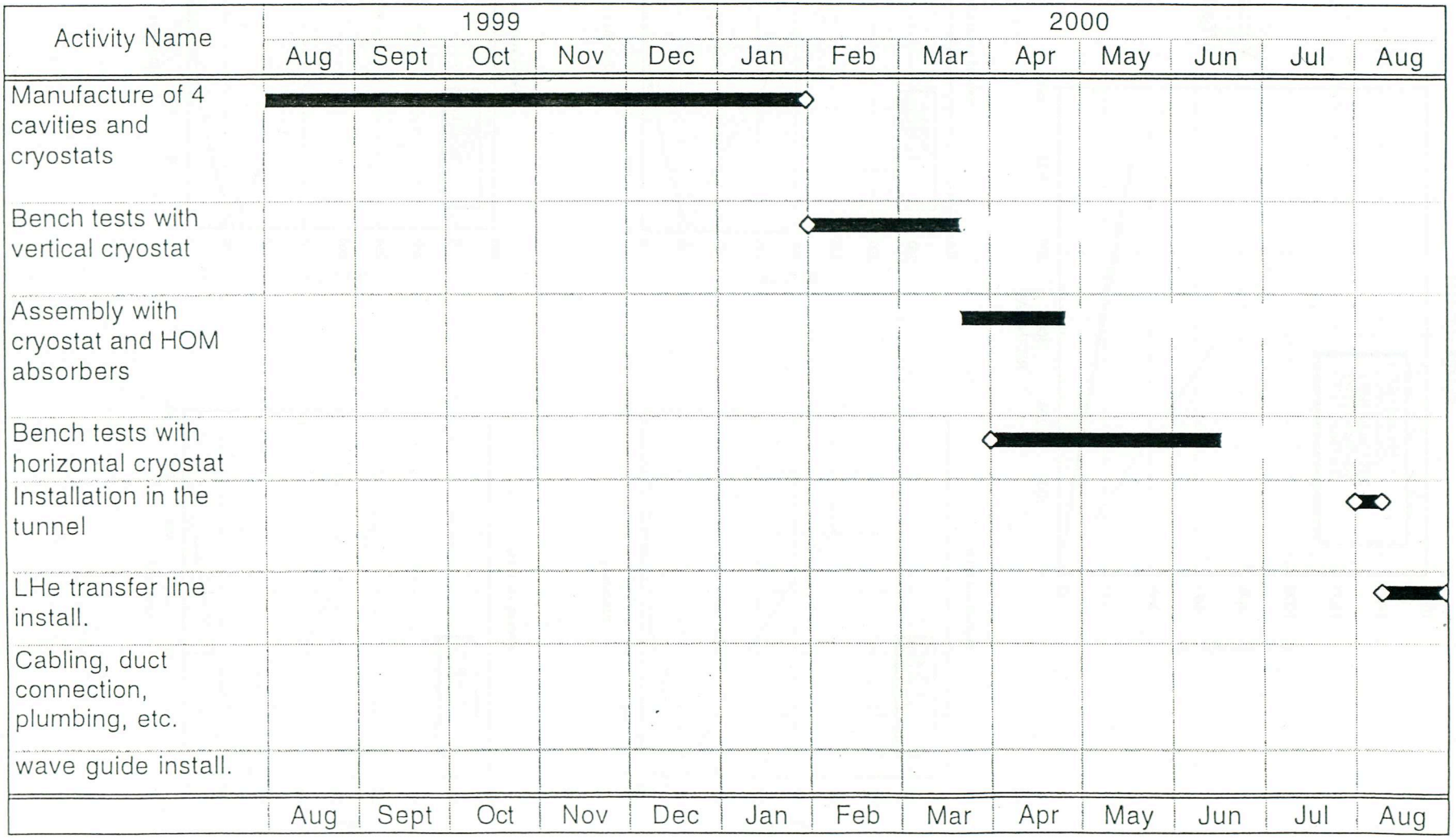


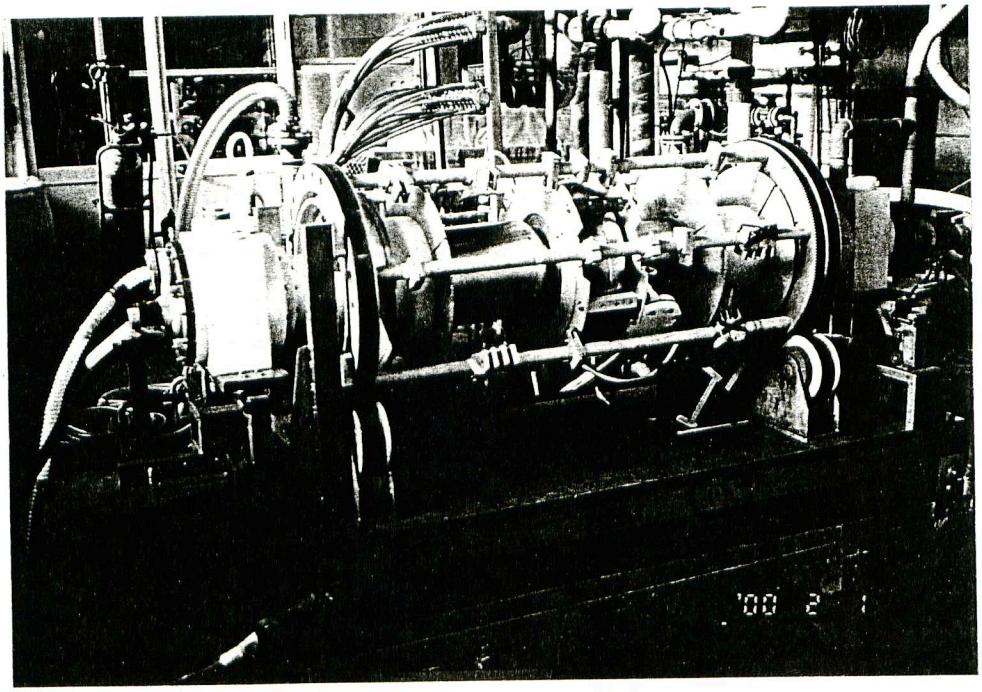






Tentative schedule for the next four cavity modules

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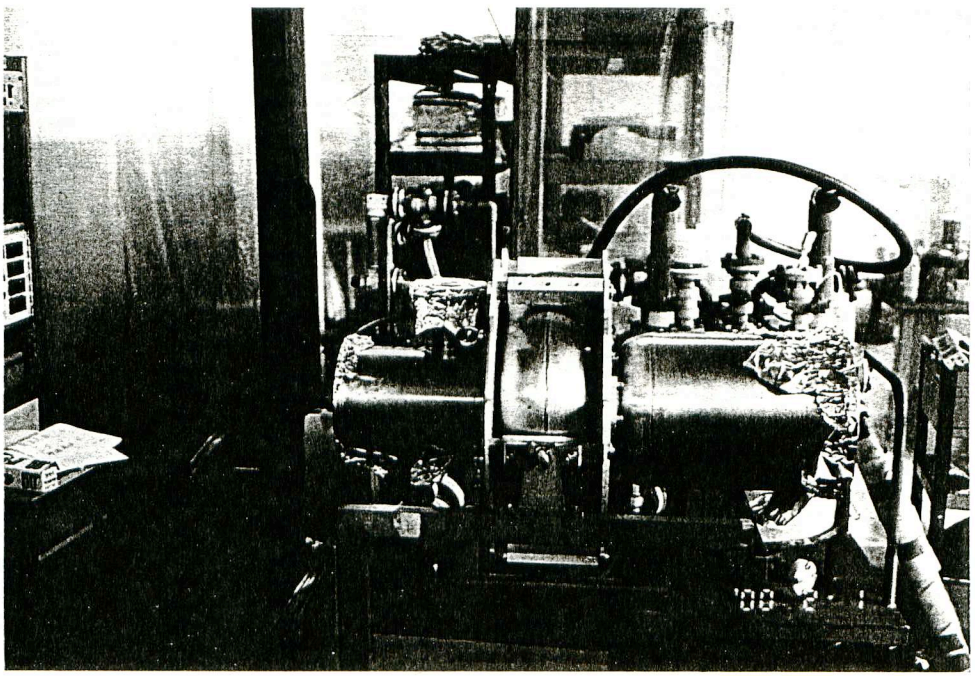
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Summary

- Four superconducting cavity modules have been working stably with few trips more than one year.
- New input coupler processing method using bias voltage seems work well for high power operation without beam processing.
- Next four modules have been contructing on time .