



17TH ADVANCED BEAM DYNAMICS WORKSHOP ON

FUTURE LIGHT SOURCES

Use of Cavity Monitors in Linear Light Sources

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APPLICATIONS

I BUNCH COMPRESSION DIAGNOSIS

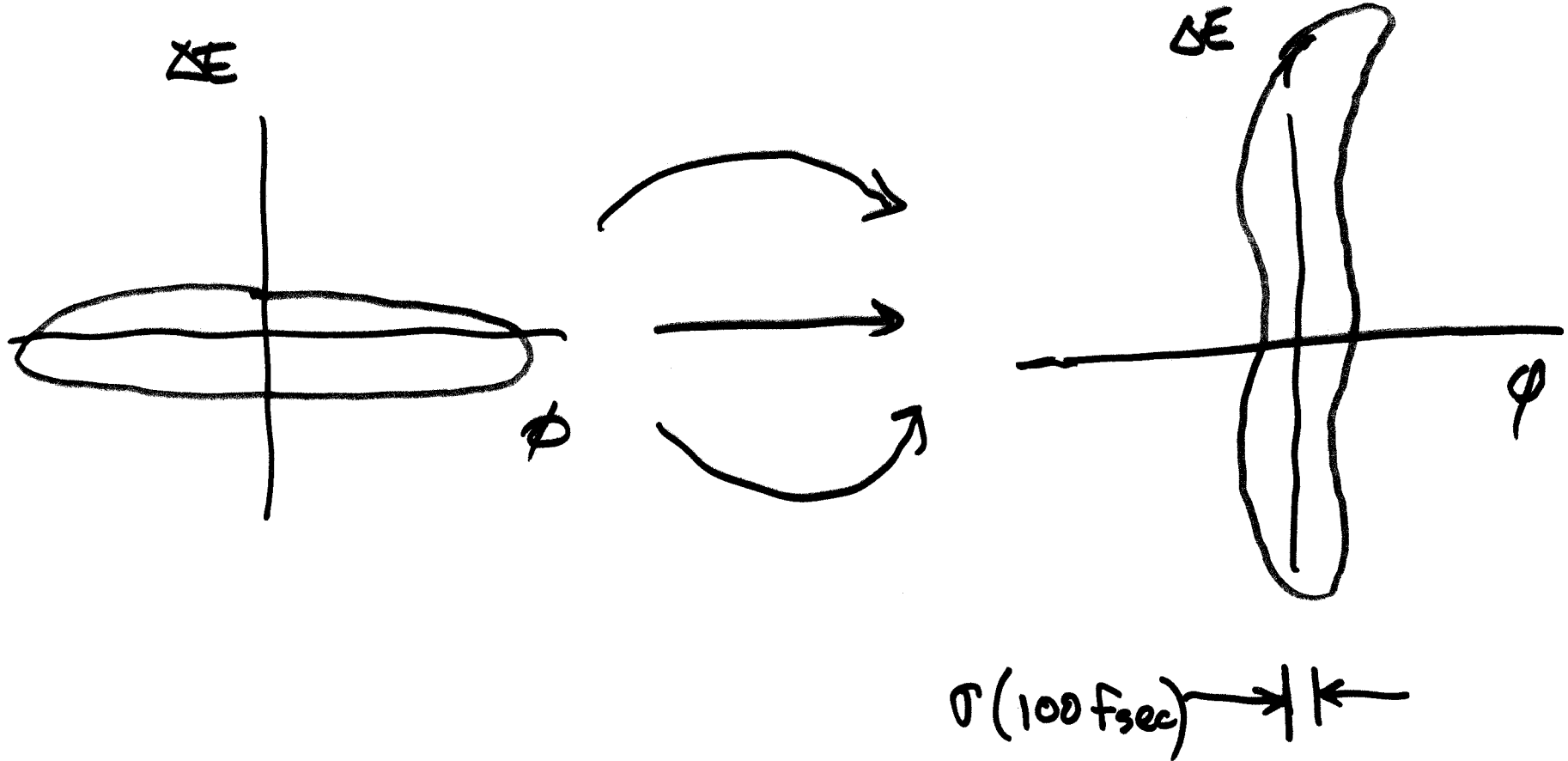
A. COMMISSIONING

B. OPERATIONS

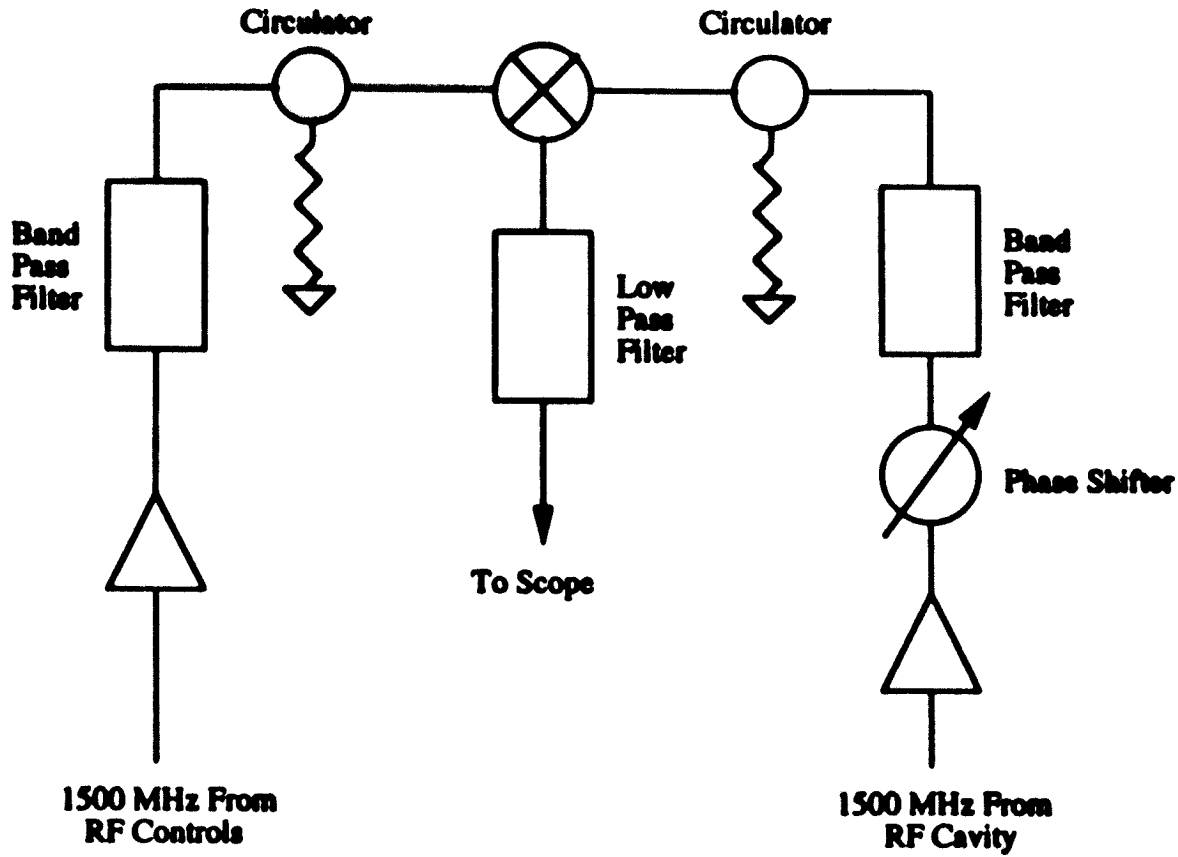
II POSITION MONITOR

III CHARGE, CURRENT

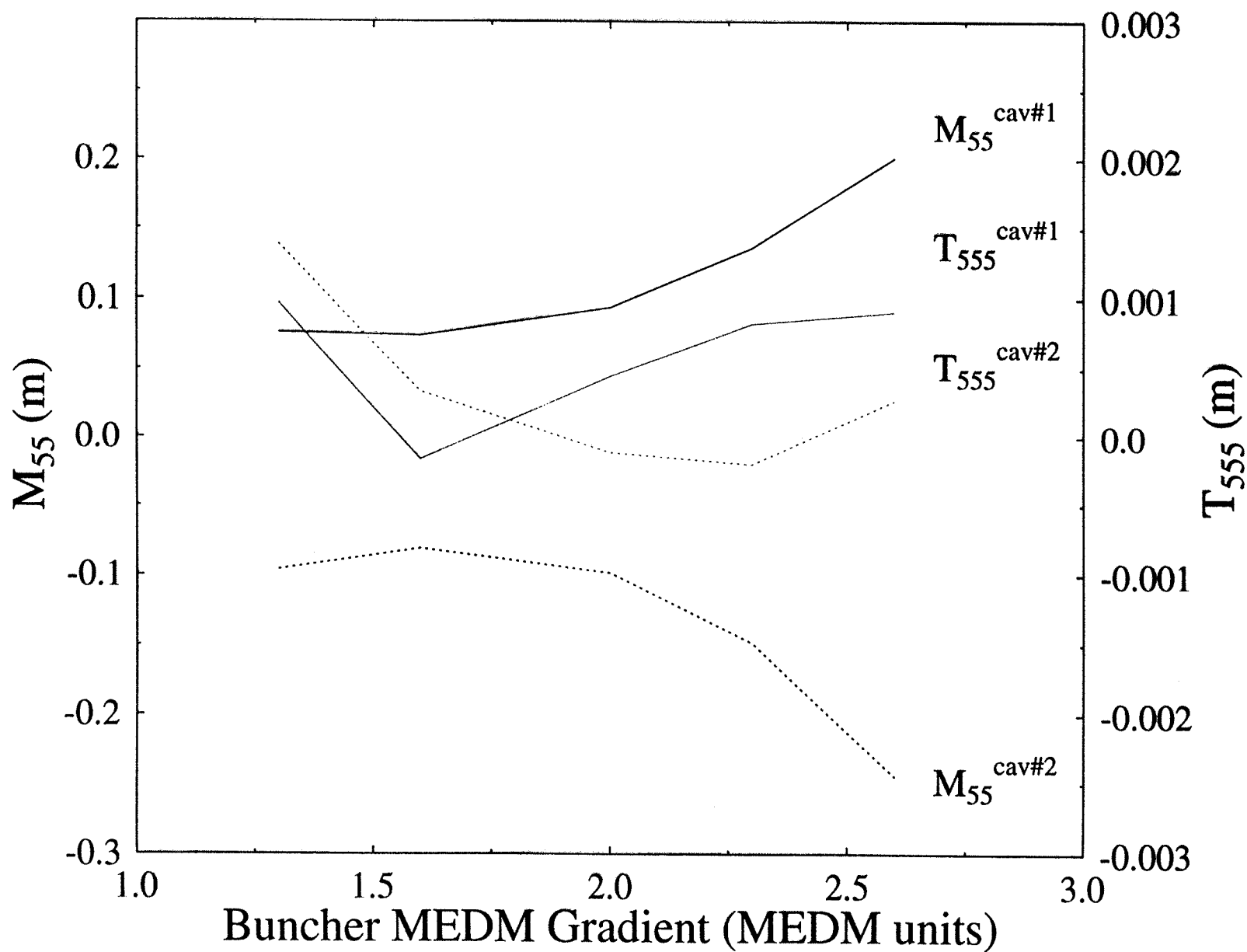
GENERIC BUNCH COMPRESSOR



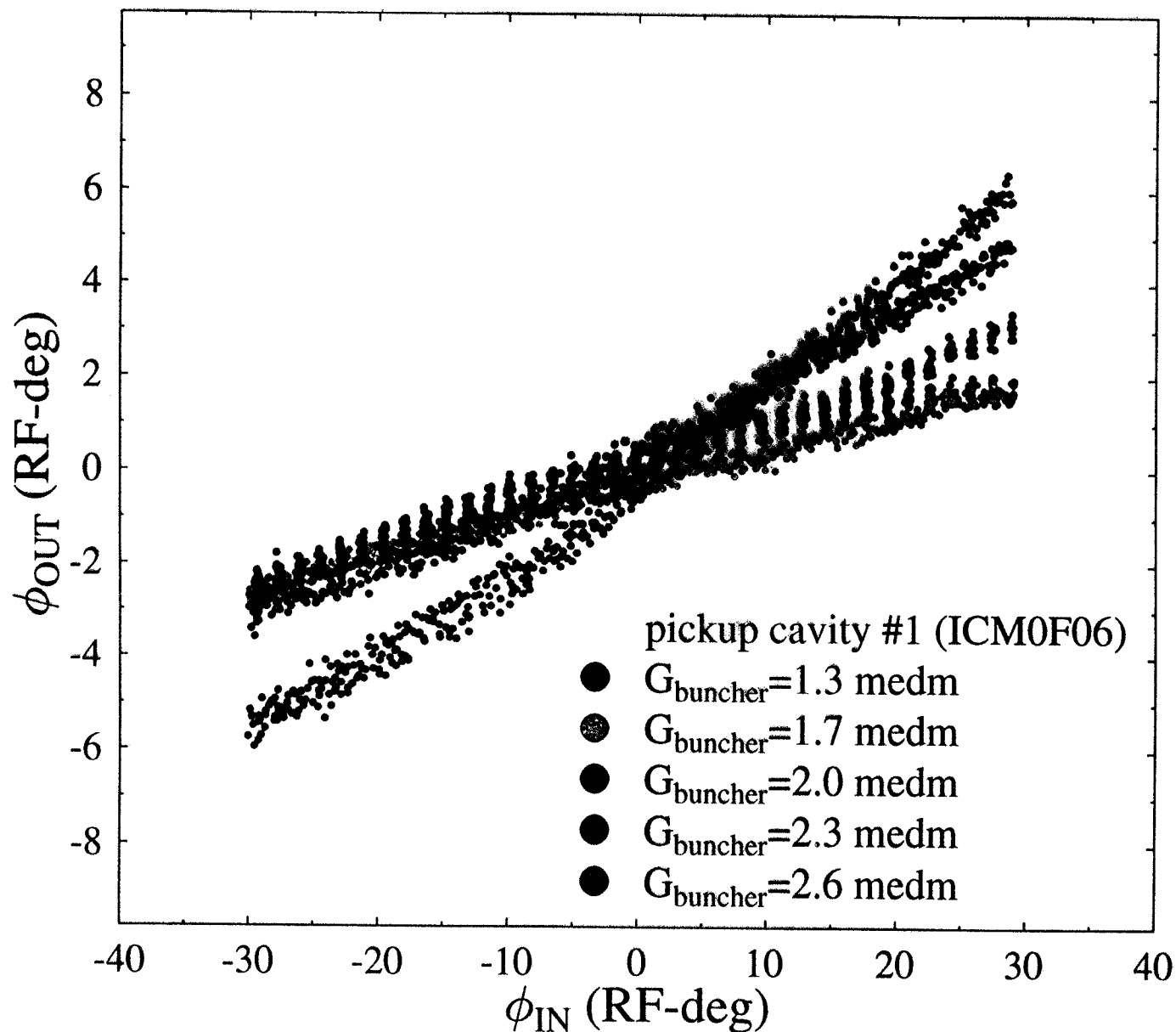
Precision Phase Detector



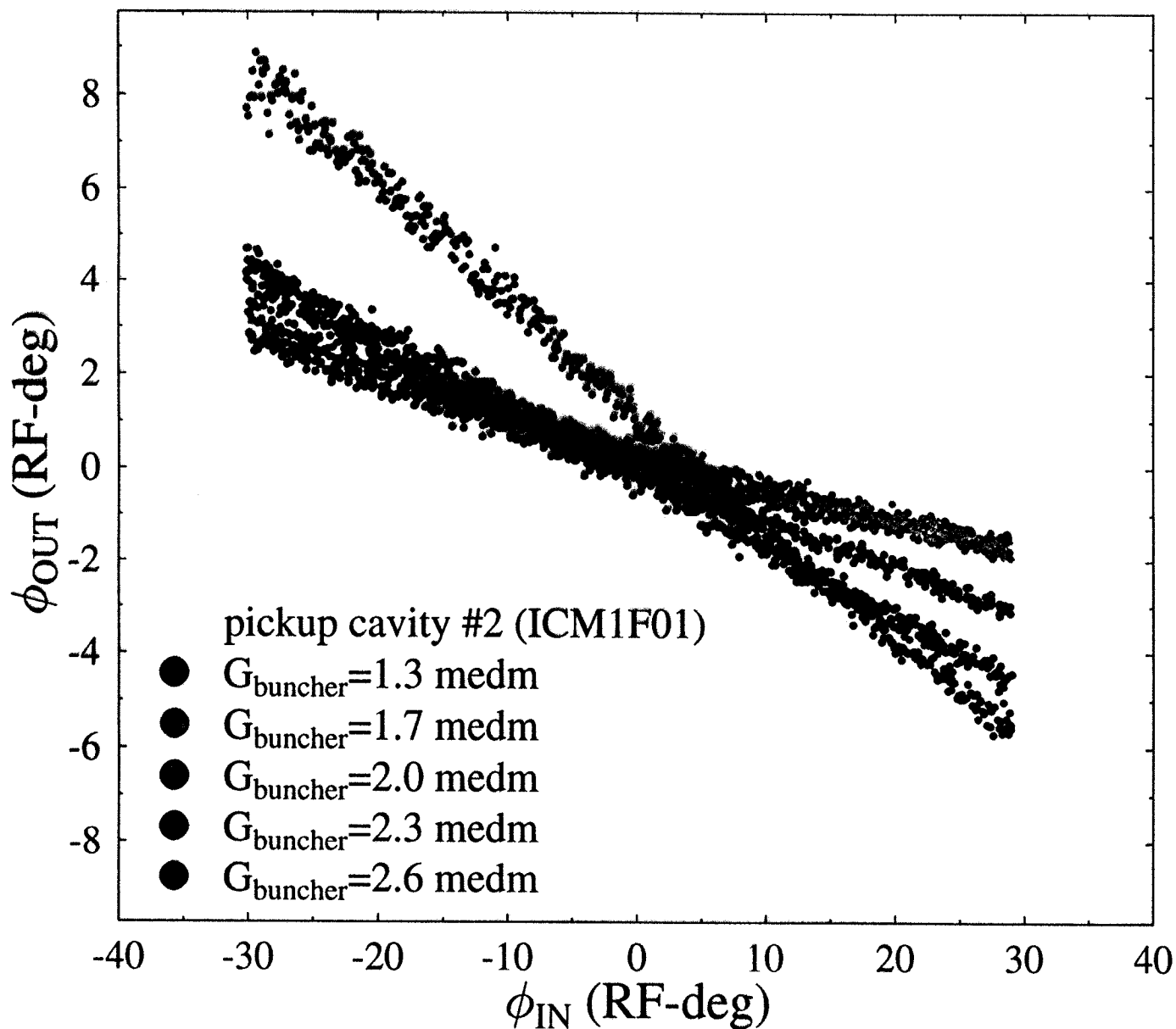
M_{55} and T_{555} measurements



$\langle \phi_{\text{in}} | \phi_{\text{out}} \rangle$ map measurement Dec-8-98



$\langle \phi_{\text{in}} | \phi_{\text{out}} \rangle$ map measurement Dec-8-98



CAVITY BEAM POSITION

SCALE FROM JLAB NUMBERS (MIGHT BE BETTER RESULTS OUT THERE AT FACTOR OF 2 LEVEL!)

1 nA BPMS

"INTEGRATE" 100 μ SCL PULSE

INDIVIDUAL READINGS GOOD TO 100 μ m

$f_c = 1497$ MHz $Q \sim 1000$

.1 pC

100 μ m

1 nC

10 ^{nm}~~nA~~ OPTIMISTIC, 1 μ m OK

ISSUES

① OPTIMIZATION OF Z_{BEAM} AND Q

PROBABLY WANT TO CHOOSE GOOD Q AND REDUCE Z_{BEAM} TO LEVEL GOOD FOR BEAM DYNAMICS. ELECTRONICS?

② SIGN PROBLEM: WE STILL HAVEN'T SOLVED THIS ENTIRELY RELIABLY @ JLAB, IT'S NOT EASIER WITH SINGLE PULSE

③ TRIGGER: SETTING UP FIRST TIME MAY BE EASY BUT WANT SYSTEM TO ALSO STAY FIXED. PROBLEM WORSE FOR LOWER Q .

CONCLUSIONS

- ① CAVITY MONITORS ARE AN APPROPRIATE SOLUTION TO BEAM POSITION MONITORING, BUNCH COMPRESSION MONITORING, AND BEAM PHASE MONITORING + CURRENT?
- ② OPTIMIZATION REMAINS: TO COMPLETE NEED
IMPEDANCE BUDGET
SINGLE SHOT PRECISION RGT.
DYNAMIC RANGE RGTs. (TUNE-UP MODES?)