**ISG-X Summary** 

SLAC/FNAL/BNL/LBNL/LLNL +

高エネルギ加速器研究機構

## nanoBPMs

Simple estimates show that resolution well below 1 nm is credible for RF cavity BPM's Best to date is 25 nm from FFTB/Shintake

Marc Ross

# What are the uses of nanometer-resolution **BPMs**?

- 200 nm resolution is needed for linac operation (similar for DR and other collider regions)
  - for LC, this is not it...
- 3GLS evaluation of sub-micron stability

----

- Interesting, but still not it
- nanoBPMs:
  - Measure beam position with accuracy better than support stability
    - →Use the beam as a *mechanical 'device'* to prove active stabilization ←
    - Integrate with fast feedback (FONT/Feather)
  - Measure beam parameters other than position
    - Many applications in beam manipulation *correlations*

*ISG X – Collaboration meeting* Marc Ross/SLAC

### **More On Using Magnetic Coupling**



T. Shintake, C-band structure design.

Vladimir Vogel, BINP, for ATF (from a paper by Marc Ross) NLC DDS structure. Using slots to damp dipole wakefields. Signal used for SBPM. Micron resolution.

### Cavity BPM With TM<sub>11</sub>-mode Selective Coupler



- Dipole frequency: 11.424 *GHz*
- Dipole mode: TM<sub>11</sub>
- Coupling to waveguide: magnetic
- Beam *x*-offset couple to *y* port
- Sensitivity: 1.6*mV/nC/μm* (1.6×10<sup>9</sup>V/C/mm)
- Couple to dipole (TM<sub>11</sub>) only
- Does not couple to TM<sub>01</sub>
  - Low Q with narrow cavity gap
  - May need to damp  $TM_{01}$
  - OR, use stainless steel to lower Q

#### TM<sub>11</sub> Selective-coupling Scheme

Z. Li





#### **TUBE MOBILITY**







Raw signals



ISG X – Collaboration meeting Marc Ross/SLAC

9



Readings from BPM1 as its mover is adjusted: 32 ATF pulses x ~10 mover settings superimposed. 320 ATF pulses in total.









Kicker design ISG Meeting June 2003

ココラ デレル Nicolas@post kek jp http://acfahep kek.jp/subg/iz/feather/

#### New Injection/Extraction scheme 2

