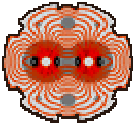


BPM simulation tests for LEP Energy Calibration

1. **Range of temperature changes during operation (found that temp. probe of stabilization system broken)**
 - Temp. test from 1999 -> temp. coef. $26\mu\text{m}/\text{K}$
 - Temp vs. fill number -> stabilized around 40°C
 - Temp. change during fill -> max $0.08\text{K} \Rightarrow \underline{2.0\ \mu\text{m}}$
2. **Position measurements in beam current dependence**
 - LEP abs beam current -> max abs current change during 2000 (except low cur. fills) $I_{\text{max}}/I_{\text{min}} = 1.47$ (corresponds to 3.3dB attenuation – viz. further)
 - Rel. current change during fill -> max 0.2
 - AGC levels in 2000 and 2003 simulations -> if attenuated, sim. AGC comparable to 2000
 - AGC level differences bv. e+,e- and 2000op., 2003sim. -> neg. pulse with only 3dB attenuator, so higher e+-differences



3. Attenuation tests

- **Relative position change with 9dB attenuation -> if $\text{Max } \Delta I_{\text{fill}} = 0.2 \Rightarrow \text{Max } \Delta x_{\text{pos}} = 0.85\mu\text{m}, \text{Max } \Delta y_{\text{pos}} = 1.3\mu\text{m}$**
- **Crosstalk plots -> highest rel. $x_{\text{crosstalk}} = 0.60\mu\text{m}, y_{\text{cross.}} = 1.95\mu\text{m}$**

4. Position plotted from pickup signals

- **X_pos calculated from electrode signals -> have to use offset and gain to match real x_pos**

Conclusion:

Temperature seems stable during operation (so probe broken during transport), but max shift during fill could be $2\mu\text{m}$.

AGC levels agree for 2003 tests, e+e- level difference measured, larger position change expected due to abs current level change.

Crosstalk effects are negligible, pos. change during fill due to cur. variation stays small too.

Position can be counted from pickup signals but not using sum signal.

On schedule:

RF noise simulation (easy)

8 bunches (ready)

2 beams

bunch length variation

gating

pickup signal delay