

MD procedure for IP aperture scans

○ MD goals

① quantify Babar background sensitivity to IP x & y angles for

- › single beams (HER & LER separately, moderate currents)
- › collisions (moderate currents, then high currents)

and determine the optimum angles (from the background viewpoint)

② cross-calibrate

- › LIPP & HIPP BPMs
- › Babar luminous & boost angles

against support-tube (ST) BPMs

③ determine LER IP angles → center of luminosity monitor

- › absolute angles (from ST BPMs) at moderate current
- › reference angles (from HIPP & LIPP), corrected for high-current operation

Measurement sequence: outline

- **Setup**
 - ① colliding beams, offset by-2 patterns at 300 mA ea.

- **Single-beam scans: Babar on**
 - ① **HER**
 - › XP scan, then YP scan @ 300 mA, offset pattern
 - › with XP & YP at optimum, raise I_H as high as it will go (gap transient)
 - ① **LER**
 - › XP scan, then YP scan @ 300 mA, offset pattern
 - › with XP & YP at optimum, raise I_L as high as it will go (gap transient)

- **Luminosity-monitor scans: Babar on**
 - ① YP(e⁺) scan, then XP(e⁺) scan @ 300 mA (offset patterns)

- **Measure current-dependence of L/HIPP-ST correlation**
 - ① with XP/YP (e⁺) centered, trickle I_H & I_L to their gap-transient limits
 - ① fill BPM gaps (straight by-2), inject up to nominal current

- **Background scans @ high current: XP(e⁻), YP(e⁺), XP(e⁺), YP(e⁻)**

Single-beam background scans: procedure

○ HER single-beam scans

① XP scan

- › check YP at correct initial value
- › scan XP; document knob closure; reset YP to initial value during scan if needed

① YP scan

- › as above (XP \leftrightarrow YP), starting at optimal XP value

① Time & knob closure permitting, autoscan XP & YP with finer steps

① With XP & YP @ bgd optimum, $I_H \rightarrow$ as high as it will go (HER gap transient)

○ LER single-beam scans

① optimize tunes on lifetime

① XP scan

- › check YP at correct initial value
- › scan XP; document knob closure;
- › adjust tunes on lifetime at every step
- › reset YP to initial value during scan if needed

① YP scan

- › as above (XP \leftrightarrow YP), starting at optimal XP value

Luminosity-monitor locator scans: procedure

- **Setup**
 - ① colliding beams, offset by-2 patterns at 300 mA ea, trickle, Babar on
 - ① optimize tunes on luminosity + background

- **Scan HER-LER YP manually (multiknob fbk)**
 - ① IPXY stays on throughout → faster stabilisation
 - ① at each step, check XP remains at initial setting

- **Set YP to optimum; scan LER XP manually (Multiknob fbk)**
 - ① reset YP to optimum @ each step
 - ① optimize tunes @ each step
 - ① still need some settle time @ each step (suspend CRR plot!)

Suggested scan ranges

○ LER

- ① XP(ST): 7.5 to 10.3 mrad, steps ~ 0.3 mrad
- ① YP(ST): -3.5 to +0.5 mrad, steps ~ 0.5 mrad

○ HER

- ① XP(ST): -17.7 to -15.7, steps ~ 0.2 mrad
- ① YP(ST): -0.5 to +3.5 mrad, steps ~ 0.5 mrad

Appendix: CRR plot files & data sets

- **CRR button files**
 - ① **BBR_BKG_LERIPORB**
 - ① **BBR_BKG_HERIPORB**

- **All data in PHYSICS_DATA:[pep2.char.05mar07]**