# PEP II Characterization

Notes: For items in *blue*, there is a macro that can be run.  Macros are located in the PEP II characterization panel (off the PEP II Application Packages panel.)

**RING CHARACTERIZATION**

*0 - Setup SCP for data taking:*Macro SETUP SCP LER (HER): It sets up dispersion steering and buffer data acquisition for MIA.  It creates a single bunch private BPM definition (#1) and enters it on POWER STEERING panel.  *0.0 - Create PHYSICS_DATA:[PEP2.CHAR.ddmmmyy] directory and PEP2CHAR logical pointing to this directory.*

*0.1 - Initialize DISPERSION POWER STEERING.  Energy change set to 300 Hz.*

*0.2 - MIA Data: Initialize BUFFERED DATA BPM panel.*

0.4 Make sure that the correct machine model is loaded. (Use design model)

**1 -While still colliding - Configuration and orbit save, into** NORMAL, at high luminosity: Macro MAGNET AND ORBIT SAVE: It saves magnet configurations. Default title is "Rings Char. <numBuckets> buckets.  <numBuckets> is EPICS DB number of buckets) 1.0 - Stop GOF button macro(s) if running.*1.1 - Save* Normal *magnet configurations: HER, LER, INJH and INJL. Save HER and LER orbits (bunch train BPM def.)*

*1.2 - Record screen-dump of tune spectrum in collision, at high currents, cursors set to peaks.*

1.3 - Dump one beam: If possible, record single ring high current orbit and tune spectrum.

1.4 - Save zero current configs for both rings.

**2 - Dump and refill one single pass into each ring (about 300 on 600 mA).**

**2.1 - Save first turn orbits.** (DR12 - PR10 e- and DR02 to PR08 e+)

**3 - Scan ? in X,Y,U,V with optimized tunes:** 3.0.1 --Optimize HER/LER tunes on luminosity. One optimization pass per tune. 3.1 - Print spectrum analyzer with markers at peaks with tunes set for Cap Sigma scan.

*3.2 - In PEP BEAM-BEAM SCAN PANEL* {_}set panel variables: single/multi Bunch to MULTI; step variable to KNOB; luminosity Monitor to HIGH; beam for each single scan to 'electrons'._*3.3 - For each beam-beam scan: X, Y, U and V*

*3.3.1 - Single scan.*

*3.3.2 - Build file name and COPY ALL TO FILE.*

*3.3.4 - Print single scans to PEPLOG.*

*3.4 Matlab PEP_ELLIPSE is called with latest ? values; print to PEPLOG.*

3.5 Make sure beam-beam scan files have been saved.

**4 - 1.5 mA each ring in a single bunch; non-colliding.** (default*: bunch 0 in HER, bunch 400 in LER).*Tune frequencies (Hz)| 10/4/2005 | 2/1/2006 |

| | | |
|---|---|---|
| LER: X 75088; Y 80197 | X 71656; Y 80337 | |
| HER: X 70306;Y 86150 | X 71769; Y 84969 | |

4.0 - Calibrate single bunch.  Calibrate, refine, check counts, make public. (If needed)

(Also re-create single bunch BPM DEF on SCP DEF #1)

4.1 - Save single bunch beam orbits into NORMAL

4.2 - Record Yunhai-orbits  i.e. run the COUPDISP_HER/LER macros.

(INDEX -> Tuning Application Index -> F8.)

4.3 - Measure Dispersion:

-- SCAN BPMS, PLOT YTRAJEC and print to PEPLOG, (PLOT XTRAJEC and print to PEPLOG.)

4.4 - Measure Phase advance: (Two rings in parallel)

4.4.1. *Turn off TFB, Tune tracker*_,_ LFB and LGDW.

{_}4.4.2 Turn off tune excitation on "other plane" on SCP panel._

*4.4.2 Markers to pre-determined tune values.*

*4.4.3 Excite at tune frequency. (SINE CW Sets up spectrum analyzer and SCP phase advance panel.)*

4.4.4 Tweak source level and view multiple BPMS to verify proper kick. Take data and save it. Print to PEPLOG.

Note: Longitudinal noise file generated with opi00gtw01:/u1/lfb/RF/make_sine.m  For longitudinal data, make sure that the noise file's frequency and the feedbacks off longitudinal tune agree.

4.5 - Take MIA data - 1 set/plane (X,Y,Z) /ring.

*4.5.1 Macro to setup measurement is done at step 0.2.*

4.5.2 Save data to PEP2CHAR:MIA_HER_X_01_comment.MAT

(OR LER/X,Y,Z; comment is optional.)

4.6 - Repeat 4.4 and 4.5 for other planes (Y and Z).

4.7 - Check MIA data file size with MMC> dir pep2char /size

```
MIA_HER_X_01.MAT;1     28500
MIA_HER_Y_01.MAT;1     28500
MIA_HER_Z_01.MAT;1     28500
MIA_LER_X_01.MAT;1     31154
MIA_LER_Y_01.MAT;1     31154
MIA_LER_Z_01.MAT;1     31154
```

**5.0 - Restore** 5.1 Turn on FFBK, TFB, Tune tracker, LFB and LGDW.