

# ILC-ESA Run Plan for July 2-25, 2007

M. Woods; June 25, 2007

Rev. 2: June 29, 2007

(Note: last 3 pages of this document have a summary;  
Preliminary -- please give comments!)

## **Pre-beam Checkout:**

- ESA profile monitor (3PR2 and 3PR4) signals at MCC;
- ESA spill detector (3C1, 3WAKE1, 3C2) scope signals at MCC.
- BPM scope monitor signals (BPM31, 3BPM1) at MCC.
- Synch light monitor signals at MCC and ChA.
- 3WS1 and 3WS2 motion control; set PMT HV
- Beamline cleanup
- Magnet checkout and mag. Field msmts (NMR, Hall, fluxgate)
- DAQ checkout
- Online stripcharts for monitoring
- 3IC6 ion chambers at T475 detector; + check ion chamber gas
- Triggers set for Beam code 3; use 0.1Hz ESA\_PED and 0.1Hz Calibration modifiers as needed. Set up for 9.8Hz beam.
- T-474/491:
  - signal processing, calibration triggers, LO, external clock for SIS
  - Interferometer system
  - BPM Cavity tuning (Yury)
  - 3BPM4 motion control
  - 3BPM7 motion control (new); Bino
- T-475
  - signal processing / DAQ
- T-480:
  - 3WAKE1 motion control. Slot 0 selected (no collimator).
- T-487
  - DAQ;
  - 3LCSP aperture clear
- T-488:
  - 3T0 clear position (or foils removed)
  - 3PR3 OUT;
  - stripline bpm signal processing
- Bunch length diagnostics (diodes and pyro detectors); Doug/Steve
- EMI setup (Gary and Nick)
  - 23GHz diode relocated to ceramic gap between 3B1-3B2

## **Pre-beam Safety Checks and ESA Access:**

- PPS IPM (preventive maintenance): in progress
- ESA to Controlled Access: Friday, June 29 ~4-6pm
- ESA PPS Certification: Monday July 2 day shift
- MPS (machine protection system) checks: date?
- BCS (beam containment system) checks: June 26
- BAS (beam authorization sheet): June 29

## **14 GeV LCLS beam for T-490** (July 2 – July 8)

\*parasitic to LCLS commissioning; likely to run in late evenings and owl shifts

### **DAILY MEETINGS, starting July 3:**

08:45 in ChA meeting room 2<sup>nd</sup> floor; July 3-8

Call-in number: 510-665-5437; id xxxx

1. setup 13.64 GeV beam to SL10  
See memo from Iverson to OPS [here](#)
  - Linac phasing (-10deg after BC-1)
  - Load optics config NOR#482 (NOR #477 scaled to 13.64 GeV)
  - Tuneup energy spread with SLM diagnostic
  - Linac orbit feedbacks
  - Energy feedback using bpms ab01 1790
  
2. T-490
  - 2.1 Pre-beam checks in ChA:
    - 2.1.1 Vacuum valves open (IV40 and IV41).
    - 2.1.2 3WAKE1 in Slot 0 position (no collimator)
    - 2.1.3 3PR2, 3PR4 IN with video monitor signals in ChA, MCC
    - 2.1.4 Spill scope signals in ChA, MCC
    - 2.1.5 A-Line Synch Light Monitor (SLM) signals in ChA, MCC
    - 2.1.6 ESA DAQ triggers set for LCLS beam code (3?; Stanek)
  - 2.2 (2-5)e9 1Hz to Beam Dump East. 14 GeV.
    - 2.2.1 Center beam on PR2 and PR4
    - 2.2.2 Map out clear aperture at PR4 by scanning A32, A33 Correctors. (Refer to Shift Log entry 46 from January 2006 run for comparison.
  - 2.3 Go to 10Hz
  - 2.4 Measure x,y spotsizes in ESA with 3WS1 and 3WS2.
  - 2.5 Commission ESA spill monitors + set HV (3C1, 3WAKE1, 3C2)
  - 2.6 Bunch length and LOLA measurements for E-z correlation; longitudinal emittance
  - 2.7 SCP BPM phasing and calibration at 2e9 bunch charge
  - 2.8 Commission ESA steer feedback?

## 2.9 Quad emittance scans; wire scans for xverse emittance

2.9.1 Swap 3WS1 to 25-micron wires if needed

2.9.2 Beam tuning knobs are:

- MKB:ALINE\_ETAXMM.MKB
- MKB:ALINE\_ETAPXMR.MKB
- MKB:ESA\_WAIST.MKB
- MKB:ESA\_XWAIST.MKB
- MKB:ESA\_YWAIST.MKB

## 3. System checkout with beam for T-474 etc.

- Run chicane dipoles at  $\pm 75A$
- Wiggler checkout
- Check edges of T-480 collimators
- T-487 measurements of short LCLS bunches?

## 4. Complete system installations and commissioning (ESA in controlled access)

4.1 T-474 new BPMs, 3BPM7 mover system

4.2 T-475 Detector and DAQ

4.3 T-487 Detectors, gratings and new remote filter control

## **28.5 GeV ILC-ESA Run 4 (July 9-25)**

### **DAILY MEETINGS:**

08:45 in ChA meeting room 2<sup>nd</sup> floor; July 9-26

Call-in number: 510-665-5437; id xxxx

**Owl Shift: 00:00 – 08:00**

**Day Shift: 08:00 – 16:00**

**Swing Shift 16:00 – 24:00**

### **Beam Setup and T-XXX System Checkouts: July 9-11**

#### Beam Setup overview:

Refer to [Linac/ESA electron beam startup checklist](#),<sup>[1]</sup> by R. Iverson and to document [Beam Setup for ILC-ESA Tests](#),<sup>[2]</sup> by R. Iverson and M. Woods.

- Sector 10 chicane off.
- Sector 2-6 phase set to -20deg
- Sector 11-20 phase set to -15deg (except LI17-18 set to 0deg)
- RTL Compressor voltage set to 40 MV.
- load BSY-A-line magnet config NOR#477 "T474 60um y on WS4300" and reference orbit Normal #134 for 28.5 GeV beam.
- Setup beam at 10Hz to BDE;
- Check Linac phasing correct (dither macro, measuring energy)
- Center beam and set energy using PR-10, SLM synch lite monitor, rf bpms and stripline bpm 1790;
- Phase and calibrate (SCP) rf bpms in A-line and alcove
- Measure location of A-line quad centers (bow tie plots and center beam in A-line quads (for Q10, Q11);
- Commission upstream Feedbacks:
  - LI26 steering feedback;
  - LI29 steering feedback;
  - “ESA FB31” energy feedback;
- Digitize SLM signal

# Monday, July 9

## Day and Swing Shift

- 1.1 Pre-beam checks in ChA:
  - 1.1.1 Vacuum valves open (IV40 and IV41).
  - 1.1.2 3WAKE1 in Slot 0 position (no collimator)
  - 1.1.3 3PR2, 3PR4 IN with video monitor signals in ChA, MCC
  - 1.1.4 Spill scope signals in ChA, MCC
  - 1.1.5 A-Line Synch Light Monitor (SLM) signals in ChA, MCC
  - 1.1.6 ESA DAQ triggers set to Beam Code 3
- 1.2 Linac Setup (beam to slits only?)
  - 1.2.1 Set Linac orbit and get Linac feedbacks working
  - 1.2.2 Tune Linac emittance
- 1.3 1.8e10 1Hz to Beam Dump East. 28.5 GeV.
  - 1.3.1 Center beam on PR2 and PR4
  - 1.3.2 Map out clear aperture at PR4 by scanning A32, A33 Correctors. (Refer to Shift Log entry 46 from January 2006 run for comparison.
  - 1.3.3 Go to 10Hz for beam to BDE

## Swing Shift

- 2.1 Continue Linac setup for orbit, emittance
- 2.2 Tuneup energy spread using SLM diagnostic
- 2.3 Commission energy feedback
- 2.3 Phase and calibrate SCP rf BPMs

## **Tuesday, July 10**

### **Owl Shift**

- 3.1 OPS to commission ESA Steer feedback
- 3.3 Sub-system checkout with ESA DAQ monitoring.

### **Day Shift**

- 4.1 Complete BCS and MPS ion chambers etc. checks for BAS
- 4.2 Commission 3IC6A,B MPS ion chambers at new T-475  
1"-diameter beampipe
- 4.3 complete phasing and calibration of SCP rf bpms; ESA steer feedback

### **Swing Shift**

- 5.1 A-line quad centering bow-tie plots
- 5.2 Set A-line orbit with BPMs. Save reference orbit and magnet Config
- 5.2 dispersion match to zero eta and eta' in ESA

## **Wednesday, July 11**

### **Owl Shift**

- 6.1 Linac emittance tuning
- 6.2 Check Linac phasing correct (dither macro, measuring energy)

### **Day Shift**

- 7.1 Complete A-line orbit setup and dispersion matching

### **Swing Shift (T-474 checkout/commissioning)**

- 8.1 T-474: BPM checkout: signal sizes, frequency, attenuation  
Offset beam by ~0.5 mm from initial orbit, look at signal amplitude and frequency.  
Access ESA if necessary to set proper attenuation
- 8.2 Calibration data

## **Thursday, July 12**

### **Owl Shift (T-474 checkout/commissioning)**

- 9.1 Commission BPM 24 readout (energy)
- 9.2 Calibration around nominal trajectory
- 9.3 Measure BPM offsets relative to nominal trajectory
- 9.4 Find optimal feedback setpoints to center on each BPM triplet



## WEEK 1

<b>Date</b>	<b>OWL</b>	<b>DAY</b>	<b>SWING</b>
<b>Fri, June 29</b>	ESA to Controlled Access @4pm	-	-
<b>Sat, June 30</b>	-	-	-
<b>Sun, July 1</b>	-	-	-

## WEEK 2

<b>Date</b>	<b>OWL</b>	<b>DAY</b>	<b>SWING</b>
<b>Mon, July 2</b>	-	PPS Certification	-
<b>Tues, July 3</b>	-	BAS approvals	-
<b>Wed, July 4</b>	T-490 beam to BDE	-	-
<b>Thurs, July 5</b>	T-490 beam to BDE	-	-
<b>Fri, July 6</b>	T-490 beam to BDE	-	-
<b>Sat, July 7</b>	T-490 beam to BDE	-	-
<b>Sun, July 8</b>	T-490 beam to BDE	-	-

### WEEK 3

<b>Date</b>	<b>OWL</b>	<b>DAY</b>	<b>SWING</b>
<b>Mon, July 9</b>	Beam Setup / Expt Chkout	Beam Setup / Expt Chkout	Beam Setup / Expt Chkout
<b>Tues, July 10</b>	Beam Setup / Expt Chkout	Beam Setup / Expt Chkout	Beam Setup / Expt Chkout
<b>Wed, July 11</b>	Beam Setup / Expt Chkout	Beam Setup / Expt Chkout	T474 BPM Commissioning
<b>Thurs, July 12</b>	T474 BPM Commissioning	Bunch Length / LOLA	T-487
<b>Fri, July 13</b>	T-487 (Harry Potter Book 5 Movie starts!)	EMI	T-474/475
<b>Sat, July 14</b>	T-474/475	T-474/475	T-480
<b>Sun, July 15</b>	T-480	T-487	T-487

### WEEK 4

<b>Date</b>	<b>OWL</b>	<b>DAY</b>	<b>SWING</b>
<b>Mon, July 16</b>	T-474	T-474	EMI
<b>Tues, July 17</b>	T-480	T-480	T-487
<b>Wed, July 18</b>	T-487	ESA access; swap coll.	T-474
<b>Thurs, July 19</b>	T-474	T-474	T-480
<b>Fri, July 20</b>	T-480 (Harry Potter Book 7 available at 00:00!!!)	T-487	T-487
<b>Sat, July 21</b>	T-474/475	T-474/T-475	T-474/475
<b>Sun, July 22</b>	T-480	T-480	EMI

**WEEK 5**

<b>Date</b>	<b>OWL</b>	<b>DAY</b>	<b>SWING</b>
<b>Mon, July 23</b>	T-474/475	T-474/475	T-474/475
<b>Tues, July 24</b>	T-474/475	T-480	T-480
<b>Wed, July 25</b>	T-480	-	-