



Polarized e- source
LCWS/ILC Meeting DESY 2007

Status and
EDR planning

A. Brachmann



Polarized Electron Source Work Package Overview

- WBS 2.3 Design (EDR management)
- WBS 3.3.1.1. Source Laser R&D
- WBS 3.3.1.2. Polarized Gun Development
- WBS 3.3.1.3. Injector Development
- WBS 3.3.1.4. Photocathode Development



WBS 3.3.1.1. Source Laser development

- Work continues at SLAC
- FY07 goal is generation of 3 MHz pulsetrain using mode locked oscillator and fast Pockel's cell
- FY08 goal: first incarnation of amplifier – regenerative amplifier design using 40 W cw pump laser
- Test photo cathodes using laser and SLC gun
- Generate e- bunch train using SLC gun at SLAC's Injector test facility



WBS 3.3.1.2. Polarized Gun Development

- Needed is 140 kV min → design 200 kV
- Work will start in FY08 at JLAB
- Combine advantageous SLAC and JLAB gun features
- (HV power supply, vacuum design, load lock)
- Prototype development

WBS 3.3.1.3. Injector

- Design and Development of injector specific RF structures
- SHB (218, 433 MHz)
- L-band bunchers
- Pre-accelerating structures

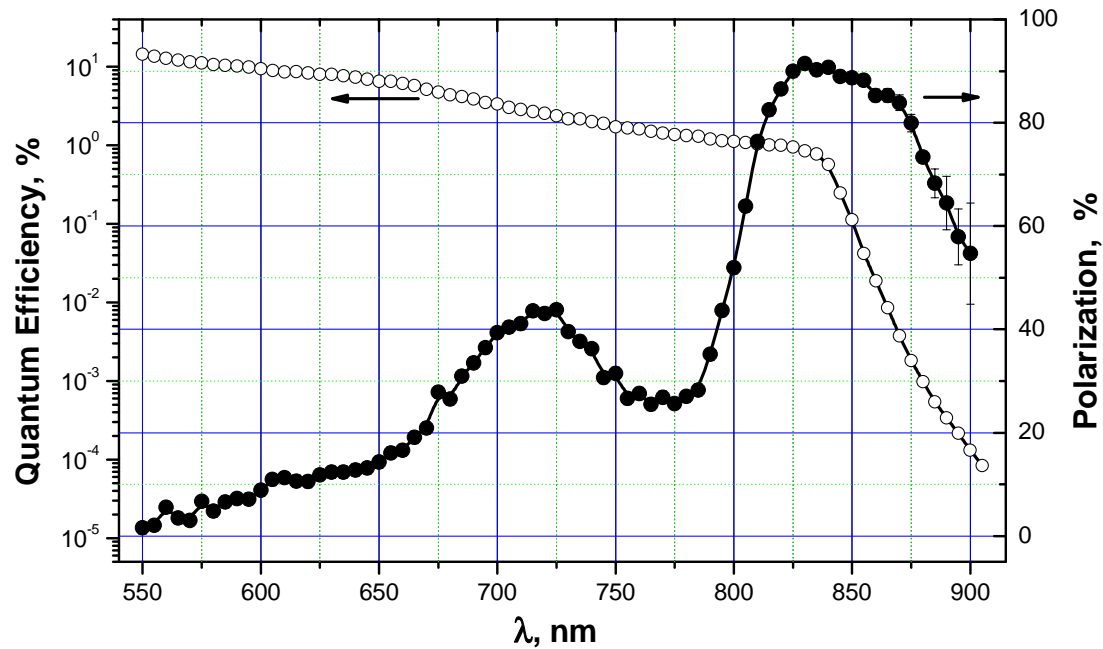


WBS 3.3.1.4. Photocathode Development

- Supported by ILC (mostly FTE's, small M&S contribution)
- Several SBIR's/STTR's in FY07 (all Phase I):
 - *Activation Layer Stabilization of High Polarization Photocathodes in Sub-Optimal RF Gun Environments.*
 - *High Polarization and High Peak Current Compositionally Graded AlGaAs/GaAs Superlattice Photocathodes for RF Gun Applications.*
 - *High Polarization and High Robustness Antimonide Based Superlattice Photocathodes for RF Gun Applications.*
 - *All applicable to DC guns as well*
- Collaboration with University of St. Petersburg (Russia):
 - *Study of AlInGaAs/AlGaAs cathodes*

St. Petersburg Data – Polarization Record of 92 %

SPbSPU data. November 28, 2006
 AlInGaAs/AlGaAs Superlattice 7-307. Room temperature



Measurement of surface charge limit at SLAC using SLC gun.



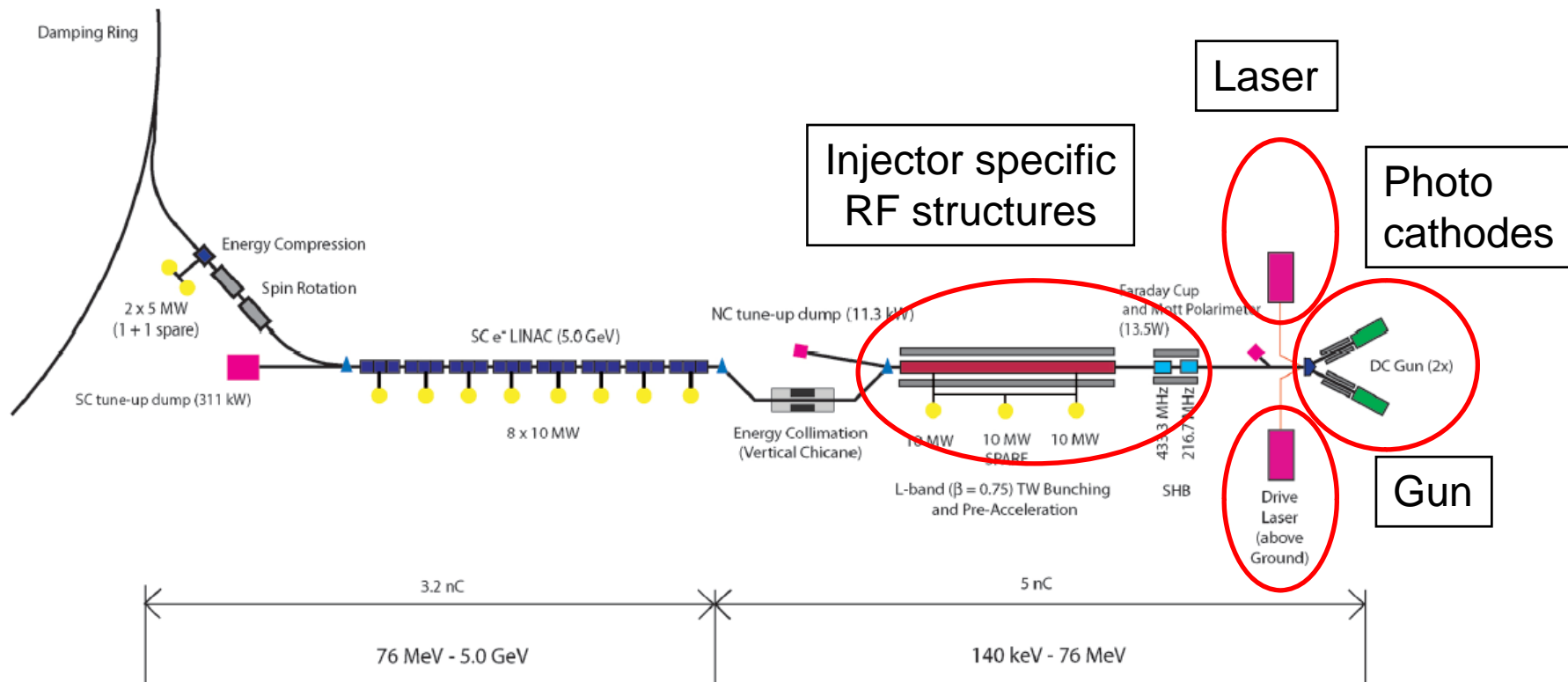
Regions

- Americas
 - SLAC
 - JLAB
- Asia – KEK, Universities need to define interests/contributions/deliverables
 - HV designs for DC gun
 - Photocathode R&D

EDR Planning

- Design is well defined (no alternatives at this point, we decided not to pursue alternative options such as a polarized RF-Gun, at least not directly through ILC funding)
- Much of EDR is part of R&D program (e.g. laser system, gun development)
- EDR part 1: Component design
- EDR part 2: Systems design and integration

EDR Effort Focus





EDR Component Design

- Laser system
- DC Polarized Gun
- SHB, L-band bunching
 - Design, (Prototypes)
- Pre-acceleration
- Booster Linac (use Main linac Design)
- E-LTR (share work with RTML, e+)

EDR Systems Design and Integration

- Connect and integrate ‘Components’
- Ensure consistency – requires close interface with Technical/Global Systems → eg. RF, controls, civil, etc.
- Main requirement (in addition to critical R&D) is design work → ramp up in FTE’s
- Need commitment to delivery



EDR Milestones and Time Line

- Dec 07: EDR Scope definition: design depth and breadth, cost, schedule, staff
- Dec 09: Freeze layout, full component and civil specifications
- Jan 09: EDR detailed component inventory
- May 09: First cost review
- Dec 09: Deliver EDR and preconstruction work plan



Proposed (requested) EDR Staff Resources

Work Package	FY08	FY09
2.3 (Design)	1.25	2.5
3.3.1.1 (Laser)	0.5	1
3.3.1.2 (Gun)	0.75	1.5
3.3.1.3 (Injector)	0.5	1
3.3.1.4 (Photocathode)	0.5	1
Totals	3.5	7