



Working Group 1: Electron Guns and Injector Designs

Conveners: I. Bazarov (Cornell University), I. Ben-Zvi (BNL)

P.C. Contacts: G. Neil (JLAB),
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C. Sinclair (Cornell University),
Z. Zhao (Shanghai Institute of Applied Physics)

WG1 Range

We define Injector as a part of the ERL up to (and including) the merge with the returning high-energy beam.

Our WG will deal with five main topics:

- I. DC/NCRF/SRF technology;
- II. Beam dynamics;
- III. Cathode / laser package;
- IV. Modelling / computational issues;
- V. Magnetized beams / polarization.

WG1 Range

Two Joint Sessions:

J.I. (with WG2) Merger design and limiting phenomena

J.II.(with WG4) Necessary beam diagnostics in the injector

Sample Charge Items for WG1

I. DC/NCRF/SRF Technology

- Identify advantages and disadvantages for each of the gun types (DC/NCRF/SRF) in prospect of providing CW high brightness beams
- List key challenges for development of the three gun types

Sample Charge Items for WG1

II. Beam Dynamics

- Identify all mechanisms of emittance growth & detrimental phenomena in the injector
- Emittance compensation, bunch compression schemes in the injector

Sample Charge Items for WG1

III. Cathode / Laser Package

- Compile/refine the table of major photocathodes that are/can be used in photoguns with their important characteristics
- Laser requirements and choices
- What is optimal transverse and longitudinal shape for laser pulse?

Sample Charge Items for WG1

IV. Modeling / Computational Issues

- Compile the table of available space charge codes with their abilities and limitations; identify need for new computational tools if any (c.f. WG2)
- Accuracy / benchmarking of the space charge codes

Sample Charge Items for WG1

V. Magnetized beams / polarization

- Identify needs (specs) for polarized electron beams; list R&D items necessary to achieve them

Sample Charge Items for WG1/WG2

J.I. Merger Design and Limiting Phenomena

- List critical issues for merger design: optimal injector energy, optimal bunch length, necessary beam matching, minimizing merger length and bending angle
- Design strawman merger that minimized derogatory phenomena

Sample Charge Items for WG1/WG4

J.II. Necessary beam diagnostics in the injector

- Identify noninterceptive diagnostics techniques for CW beam
- Compile the list of necessary beam diagnostics (commissioning & running)
- Trajectory correction in the injector

WG1 Program (Talks)

Sunday (Day 1 of WGs)

Morning: *Session 1 – Technology choices I (RF & DC)*

8:30-8:55 Dowell (SLAC)

8:55-9:20 Sinclair (Cornell)

9:20-9:33 Hernandez-Garcia (JLAB)

Session 2 – Technology choices II (SRF)

11:00-11:25 Burrill (BNL)

11:25-11:50 Janssen (Rossendorf)

11:50-12:15 Nguyen (LANL)

Afternoon: *Session 3 – Beam Dynamics & Modelling*

14:00-14:25 Rosenzweig (UCLA)

14:25-14:50 Bazarov (Cornell)

14:50-15:03 Wang (ANL)

15:03-15:16 Limborg (SLAC)

WG1 Program (Talks)

Monday (Day 2 of WGs)

Morning: *Session 4 – Cathodes / Photoemission*

8:30-8:55 Srinivasan-Rao (BNL)

8:55-9:20 Chang (Stony Brook)

9:20-9:33 Nishitani (JAERI)

9:33-9:46 Minehara (JAERI)

WG1/WG2 Joint Session

11:00-11:25 Litvinenko (BNL)

11:25-11:50 Lidia (LBNL)

11:50-12:05 Hajima (JAERI)

Afternoon: *Session 5 – Modelling & Novel Concepts*

15:30-15:55 Ferrario (INFN)

15:55-16:08 Lewellen (ANL)

16:08-16:21 Suwada (KEK)

WG1 Program (Talks)

Tuesday (Day 3 of WGs)

Morning: *Session 6 – Laser Issues*

8:30-8:55 Shinn (JLAB)

8:55-9:20 Tomizawa (Spring-8)

WG1/WG4 Joint Session

11:00-11:20 Benson (JLAB)

11:20-11:40 Graves (MIT)

Afternoon: *Session 7 – Magnetized Beams / Polarization*

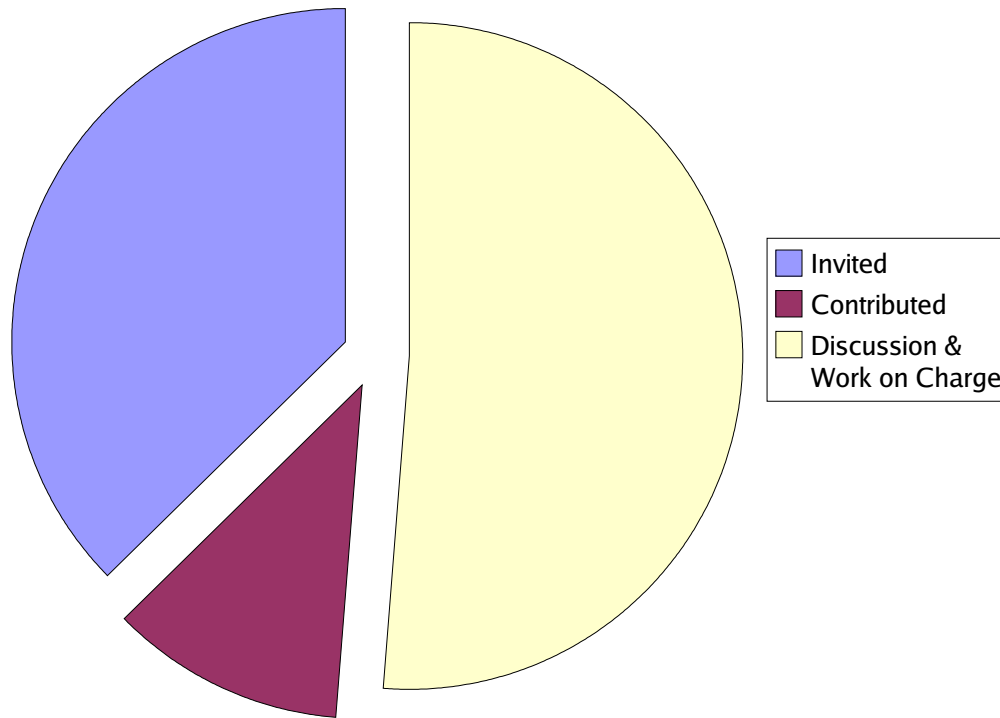
14:00-14:25 Poelker (JLAB)

14:25-14:38 Piot (FNAL)

NOTE: If your name did not appear,
but you believe that it should,
talk to Ilan and me

WG1 is no Conference

18.5 hours total



- First session (Sunday morning) will include Charge Refinement by all participants of the WG1
- The main goal of the WG1 is to address the Charge

Bring your wit & expertise to the WG1!