WG1: ERL Injectors

Injector Performance, Electron Guns, Cathodes, Lasers

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Challenges

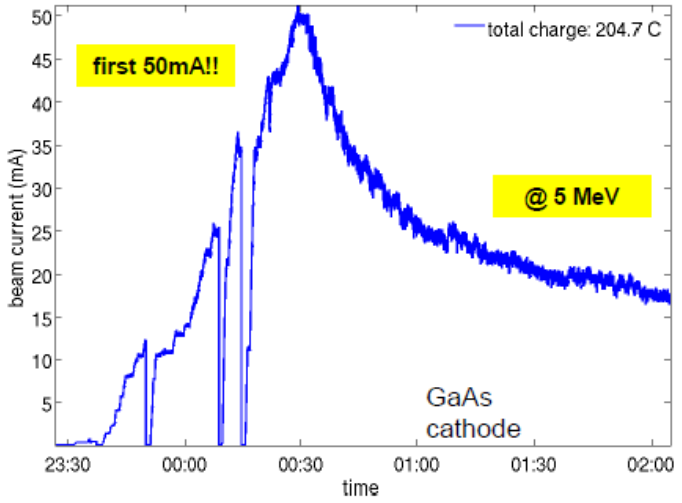
- An ERL is only as good as its source
  - (also the primary advantage of ERLs!)

- Primary challenge is maximizing some merit function, e.g. brightness

$$B = \frac{I_{\mathrm{avg}}}{\varepsilon_x \varepsilon_y}$$

Large average current

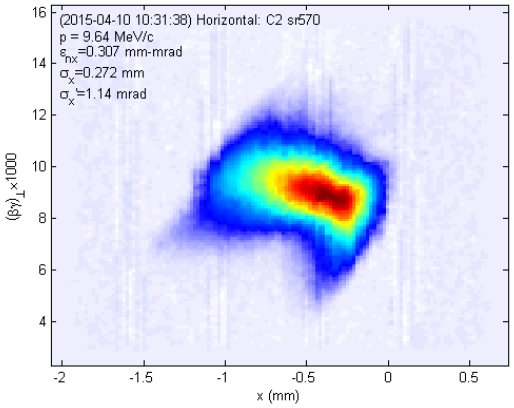
- Huge beam power (diagnostics?)
- Cathode lifetime
- Halo
- Beam loading (in the injector)
- HOM suppression
- Increased laser demands
- Ion effects
- Reaching target current

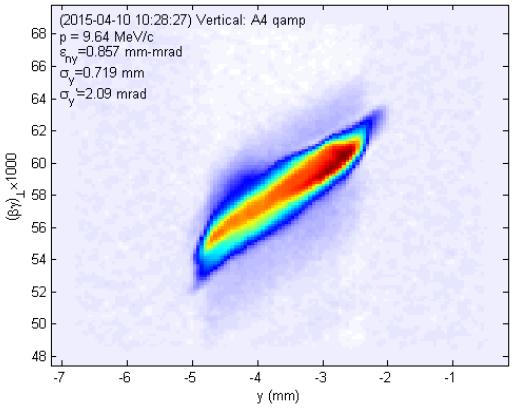


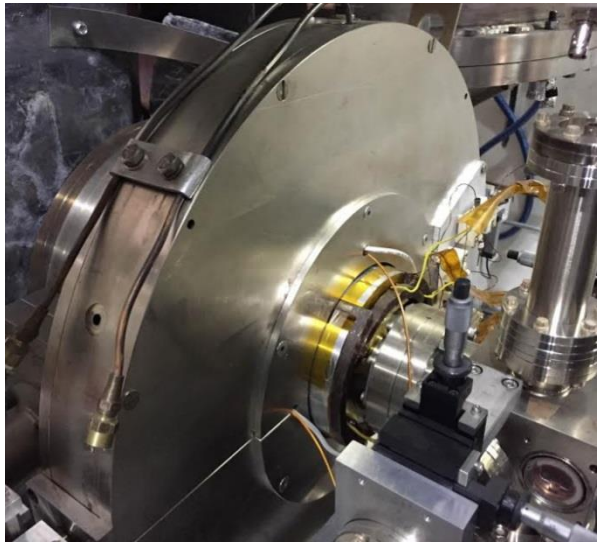
Low emittance

- CW -> Lower gradient, energy (as compared to NCRF)
- Space charge
- Stray fields
- Aberrations

} can all contribute on the same scale!







… Parameter ranges just beginning to be explored!

Charge

Explore the results and new technologies available in injectors (laser, cathode, gun). Especially:

- Operational experience
- Limits of RF, SRF, DC guns
- Reaching target current
- Beam halo in the injector

WG1 Agenda

Session 1: DC/RF Gun Development and Operation

Tuesday 10:45 – 12:25

Time	Title	Speaker
10:45	Operational Experience of DC Photoemission Gun at the compact ERL	Nobuyuki Nishimori (JAEA)
11:10	Development of a 500 kV DC Gun with Narrow Gap	Masahiro Yamamoto (KEK)
11:35	A High-Peak and High-Average Current, Low Emittance, Long Lifetime Electron Source for ERL Applications	Xiangyun Chang (Far-Tech)
12:00	The Progress of Funneling Gun for eRHIC Injector	Erdong Wang (BNL)

WG1 Agenda

Session 2: Laser and Cathode Performance

Tuesday 14:00 – 15:40

Time	Title	Speaker
14:00	High Accuracy Adaptive Laser and Electron Beam Shaping	Jared Maxson (Cornell)
14:25	Solving the Roughness of Alkali Antimonides	John Smedley (BNL)
14:50	In-situ XRR Analysis on Multi-Alkali Antimonide Photocathode Grown by Sputtering	Zihao Ding (Stony Brook)
15:15	Characterization of Multi-Alkali Antimonide Cathode at Cryogenic Temperature and its Performance in SRF Gun	Erdong Wang (BNL)

WG1 Agenda

Session 3: SRF Gun Development and Operation
Tuesday 15:55 – 17:35 (co-session with WG4)

Time	Title	Speaker
15:55	Commissioning Program for the 704 MHz SRF Gun at BNL	Wencan Xu (BNL)
16:20	Commissioning and First RF Results of the 2nd 3.5 Cell SRF for ELBE	Andre Arnold (HZDR)
16:45	First Beam Characterization of SRF Gun II at ELBE with a Cu Photocathode	Jochen Teichert (HZDR)
17:10	CsK2Sb Photocathode Development for bERLinPro	Martin Schmeisser (HZB)

WG1 Agenda

Session 4: Diagnostics in Injectors
Thursday 9:00– 10:30 (co-session with WG3)

Time	Title	Speaker
09:00	Diagnostic TestBeamLine For The MESA Injector	Igor Alexander (JoGu Universität Mainz)
09:25	A fast rotating wire scanner for use in high intensity accelerators	Steve Full (Cornell)
09:50	Detection and clearing of trapped ions in the high current Cornell photoinjector	Steve Full (Cornell)
10:15	GaAs Photocathode R&D: Energy spread measurements and the nature of the activated p-GaAs(Cs,O) activation layer	Lee Jones (ASTeC)

Enjoy the sessions!