JLab Photoelectron Guns Performance

Gun	Photocathode Wavelength	Intensity Rep Rate	Operating voltage (kV)	Static Vacuum (Torr)	Lifetime Measurements Laser Spot Size FWHM	Environment	Reference
Test Cave Load Lock	GaAs 532 nm	10 mA DC	100	8×10^{-12}	2000 C 1.5 mm 1000 C for 0.3 mm	R&D	[1] SPIN 2006
Test Cave Load Lock	GaAs/GaAsP 780 nm	1 mA CW 499 MHz	100	8×10^{-12}	210 C for 0.45 mm	R&D	[2] PAC 2007
Test Cave Load Lock	GaAs/GaAsP 780 nm	4 mA CW 1500 MHz	200	3×10^{-12}	85 C for 0.35 mm	R&D	[3] PAC 2011
Test Cave Load Lock	GaAs 780 nm	10 mA DC	100	$3\text{-}8 \times 10^{-12}$	>1000 C (study vs. position, mask, spot size, biased anode)	R&D	[4] PRST 2011
Test Cave Load Lock	K_2CsSb/Moly 532 nm	5 mA DC	200	$<5 \times 10^{-12}$	No QE Change observed for 0.5 mm	R&D	[5] PRST 2013
FEL	GaAs 532 nm	1 – 8 mA CW 75 MHz	350	5×10^{-11}	550 C for 4.0 mm	Production	[6] PAC 2007
CEBAF Load Lock	GaAs/GaAsP 780 nm	0.200 mA CW 499 MHz	130	9×10^{-13}	250 C for 1.0 mm	Production	[7] CEBAF Spring 2012

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2. J. Grames et al., "Lifetime measurements of high polarization strained-superlattice gallium arsenide at beam current >1 milliamp using a new 100 kV load lock photogun", Proceedings of PAC07, Albuquerque, New Mexico, USA, THPMS064.
3. R. Suleiman et al., "CEBAF 200 kV inverted electron gun", Proceedings of PAC11, New York, USA, WEODS3.
4. J. Grames, Riad Suleiman et al., "Charge and fluence lifetime measurement of a dc high voltage GaAs photogun at high average current", Phys. Rev. ST Accel. Beams 14, 043501 (2011).
5. R. R. Mammei et al., "Charge lifetime measurements at high average current using a K_2CsSb photocathode inside a dc voltage photogun", Phys. Rev. ST Accel. Beams 16, 033410 (2013).
6. S. Benson et al., "High power operation of the JLab IR FEL driver accelerator", Proceedings of PAC07, Albuquerque, New Mexico, USA, MOOAAB03.
7. CEBAF Spring 2012, to be submitted to PRST-AB in 2015.