

# ILC-IDT WG2 Steering Meeting #2 (Feb 14, 2022) – J. Grames (JLab)

## Defer to PreLab

- Design and build narrow-band gain-switch fiber laser
- Collaborate with industry to develop and characterize GaAs/GaAsP SL

## Consider for PrePreLab

- During GDE, JLab built two XHV inverted 200 kV guns
- Now, consider an inverted 350 kV for higher peak current

Child's Law:  $j_0 = (2.33 \times 10^{-6}) V_0^{3/2} / d^2$

Assume d=3 cm cathode/anode gap

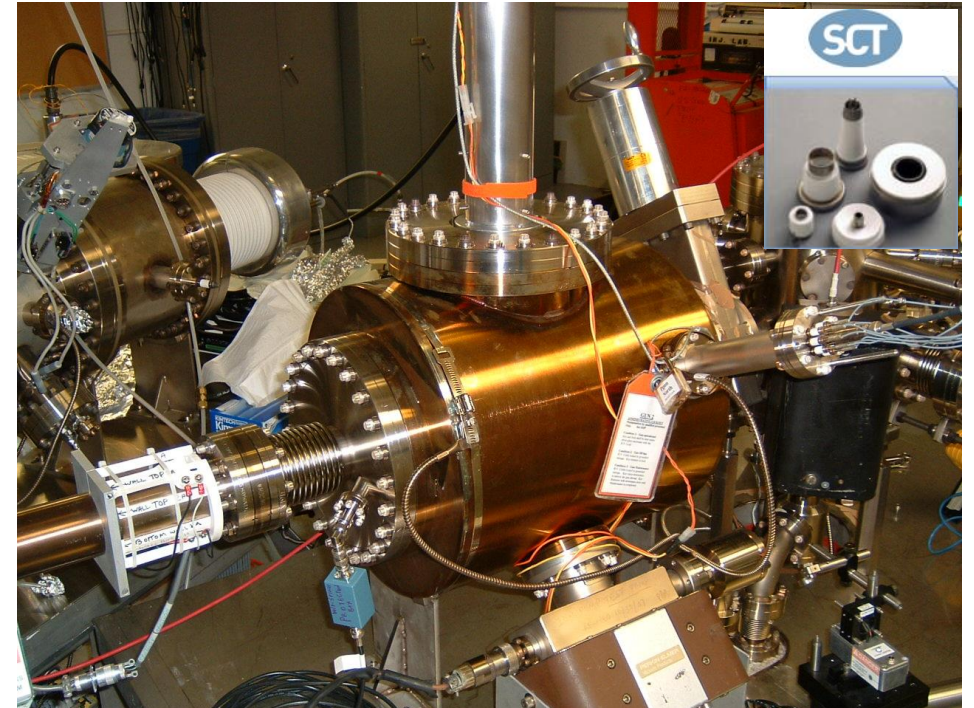
Peak current : **GDE (4.8 A)**, **TDR (11 A)**

V (kV)	$j_0$ (A/cm <sup>2</sup> )
100	7
140	14
<b>200</b>	<b>23</b>
350	53

14 A/cm<sup>2</sup> (10 mm dia. laser)

← **GDE ~ 16 A/cm<sup>2</sup>**

Current density  $j = 56$  A/cm<sup>2</sup> (5 mm dia. laser)



Jefferson Lab has built **two 200 kV DC-HV photo-guns**

- Large grain Nb tested 225 kV (>18 MV/m)
  - Stainless steel now at CEBAF 200 kV (no FE)
- Both demonstrated <2e-12 Torr (N2 equivalent)

