

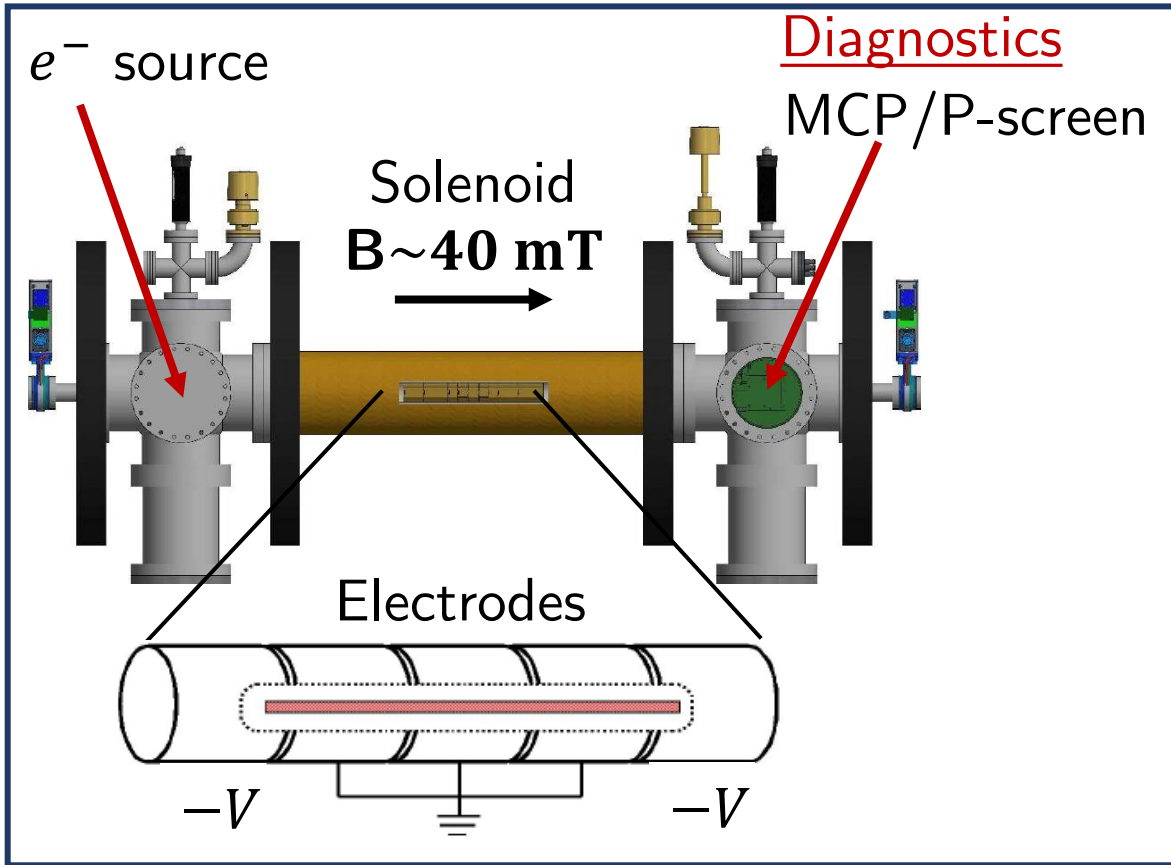
LhARA Collaboration Meeting

Update on experiments at Swansea

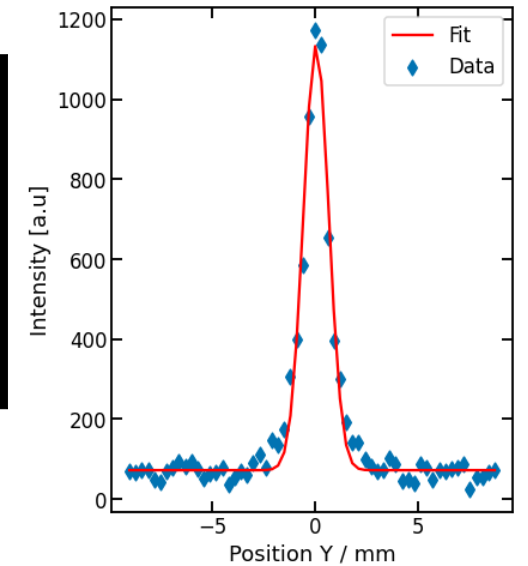
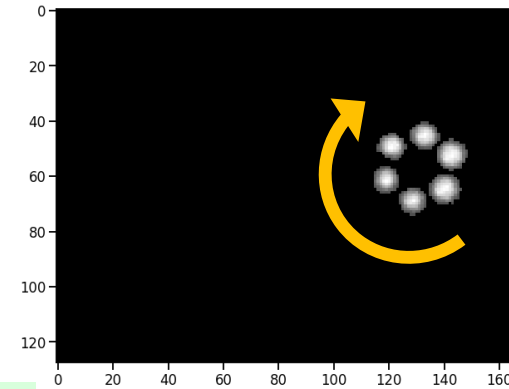
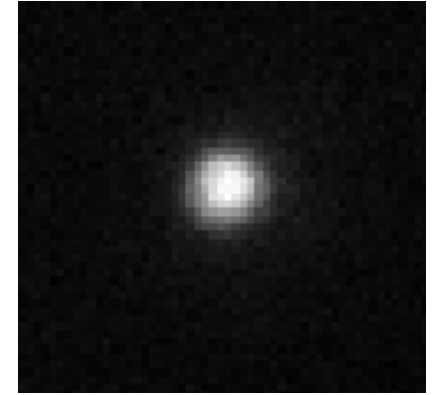
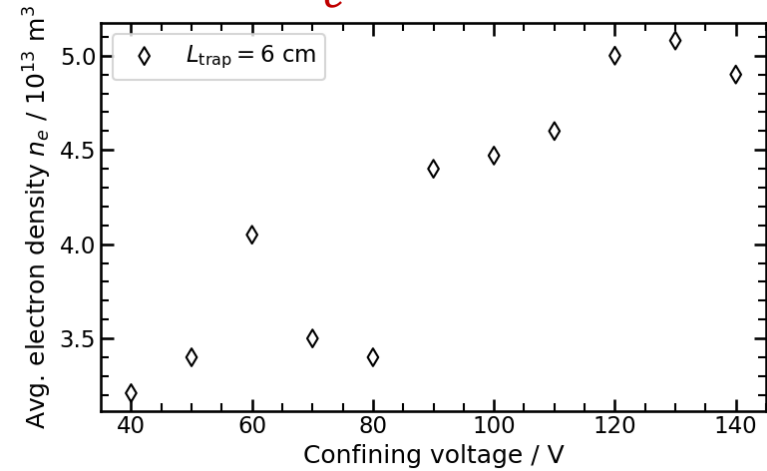
Titus Dascalu

27th April 2022

Overview of the first research visit (Oct21)



$$n_e \sim 3 - 5 \times 10^{13} \text{ m}^{-3}$$



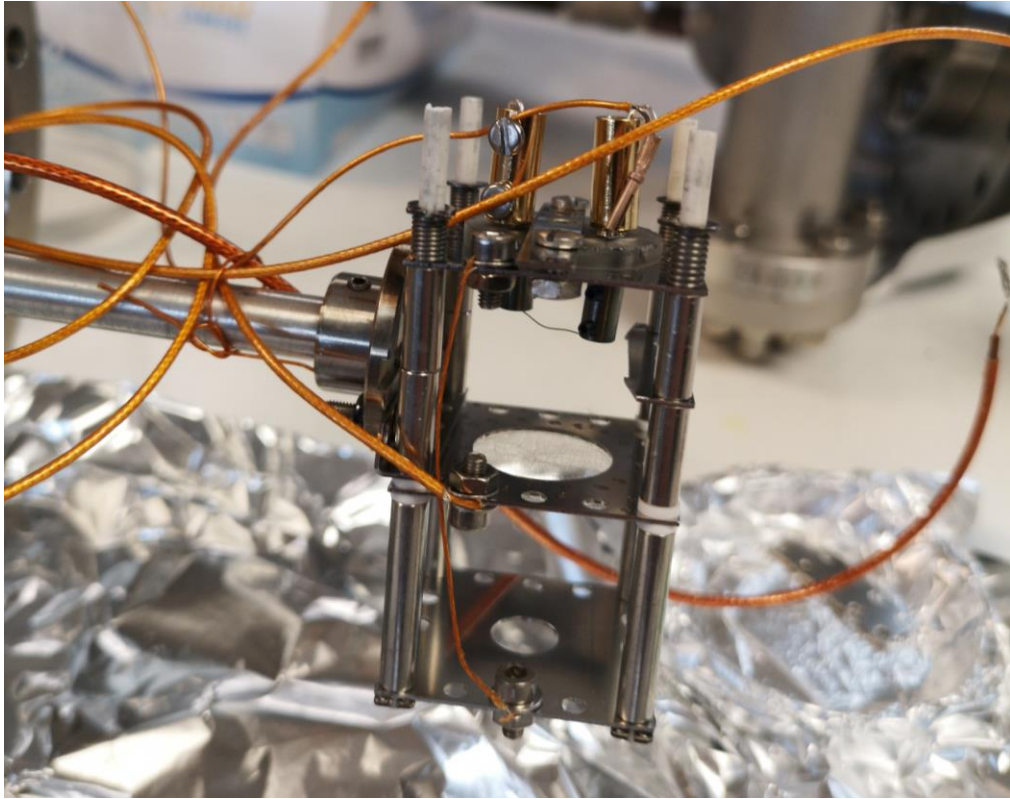
Ptcl. number $< 1 \times 10^7$
 Plasma length L_p 3–20 cm
 Plasma radius r_p $\sim 0.3 \text{ mm}$
 Debye length λ_D $\sim 1 \text{ mm}$

Plasma regime for
 $\lambda_D \ll r_p, L_p$

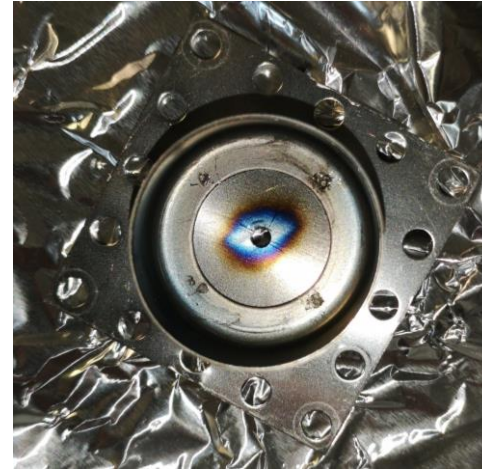
$$\sigma_{x,y} \sim 0.3 \text{ mm}$$

2nd research visit (Apr22)

e^- source was modified to provide higher currents

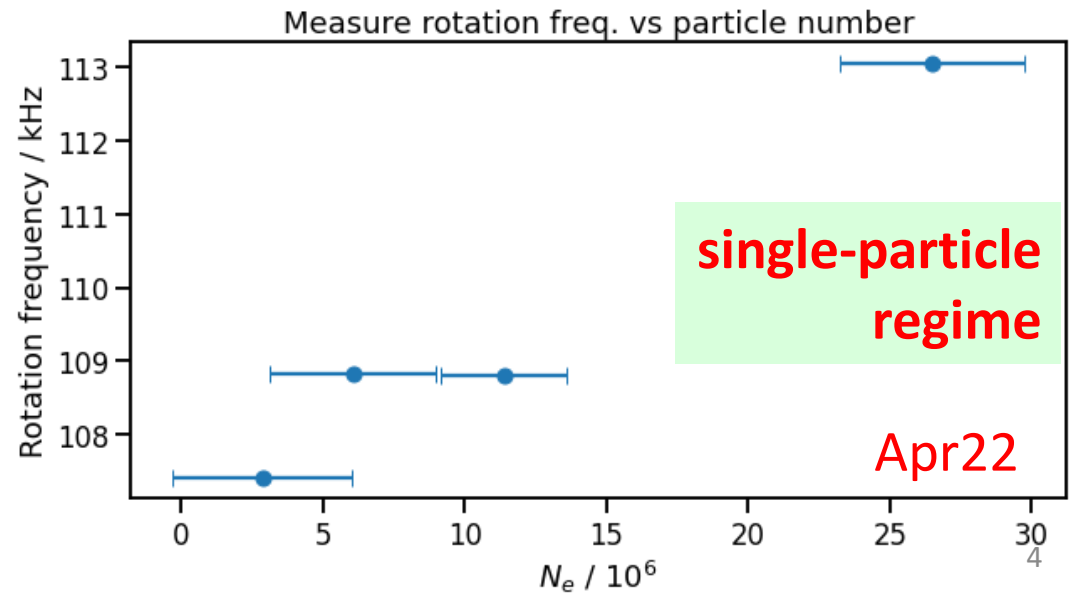
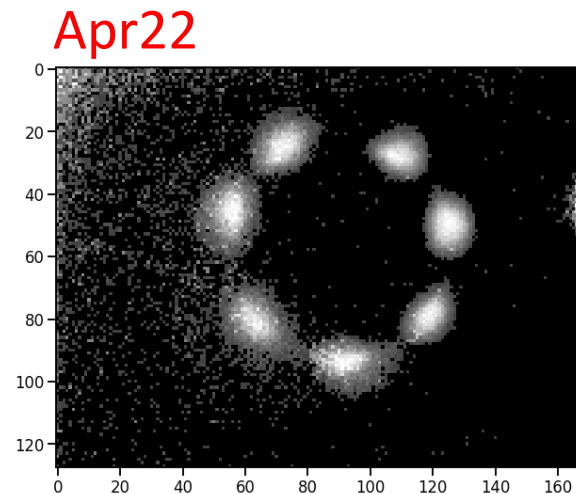
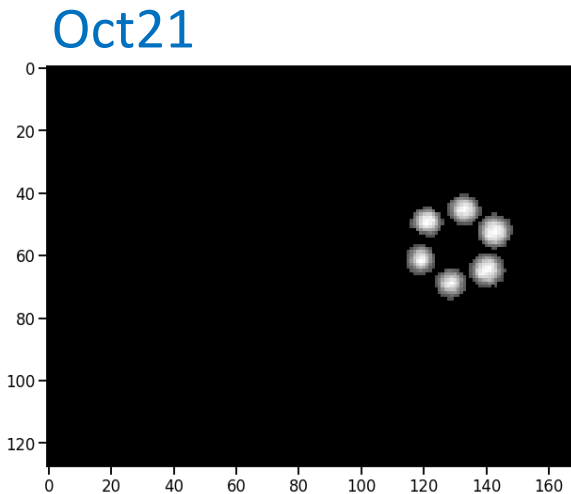
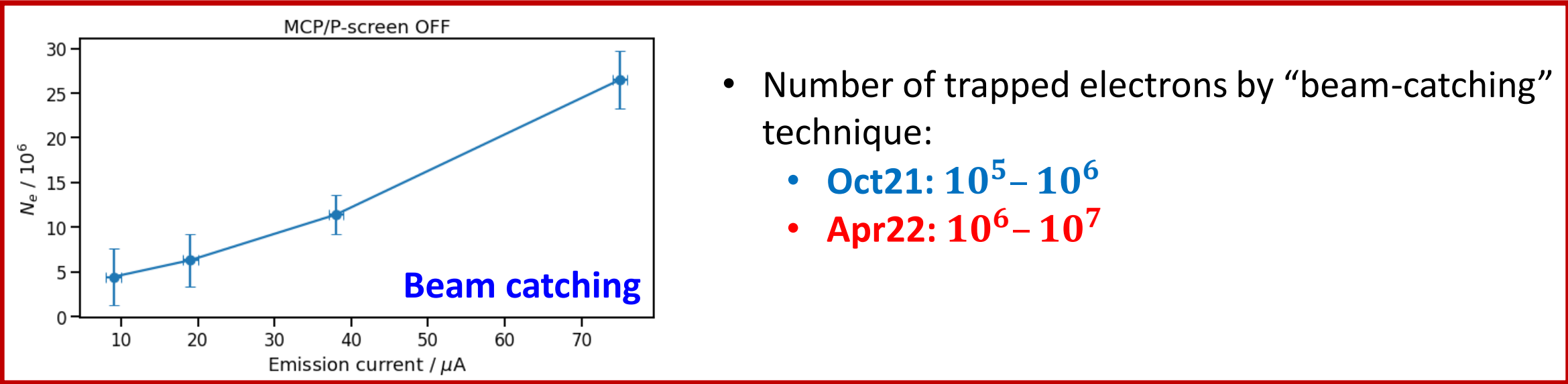


Modified source



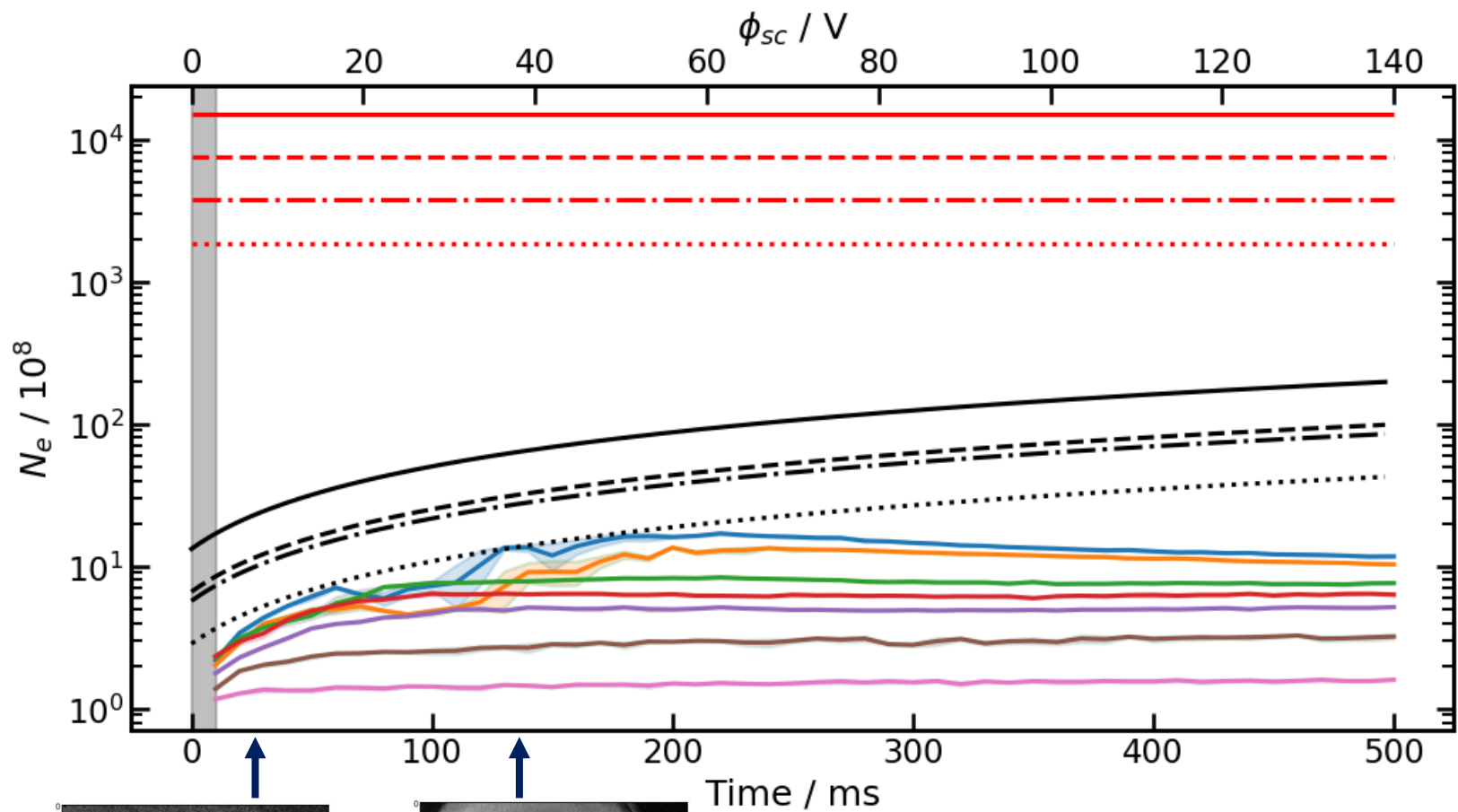
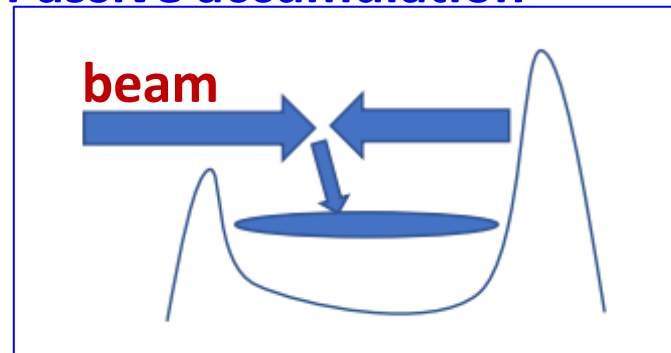
- **Removed** the collimator from the original source
- Maximum emission currents registered
 - Oct21: $\sim 13 \mu\text{A}$ (for 3 A filament current)
 - **Apr22: $\sim 320 \mu\text{A}$** (for 3.3A filament current)

2nd research visit: Preliminary measurements



Limits on the number of electron trapped

Passive accumulation



Theoretical limit for (L_p, r_p) [cm]

— SC, (20, 2)	— Brillouin, (20, 2)
- - SC, (10, 2)	- - Brillouin, (10, 2)
- · - SC, (20, 1)	- · - Brillouin, (20, 1)
···· SC, (10, 1)	···· Brillouin, (10, 1)

End-gate voltage

— 140V	— 60V
— 120V	— 40V
— 100V	— 20V
— 80V	

