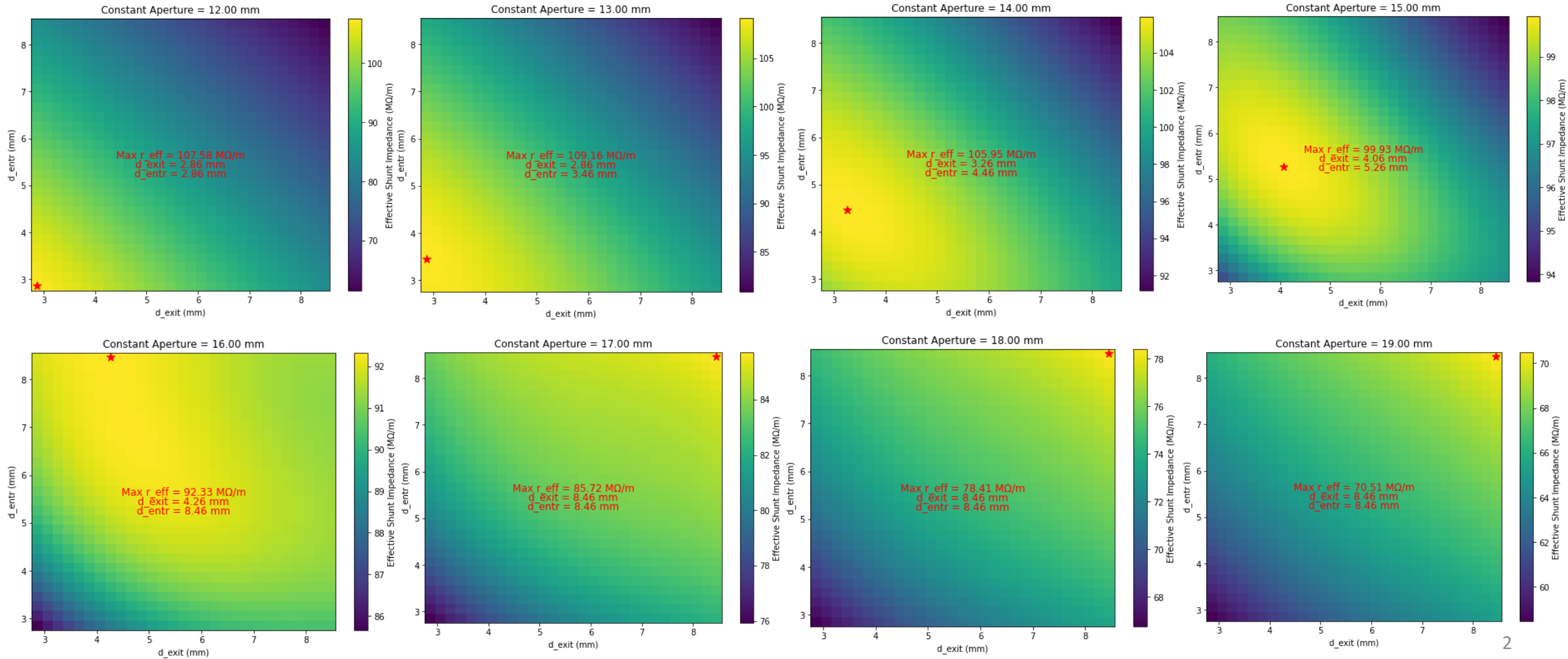


CLIC booster linac studies

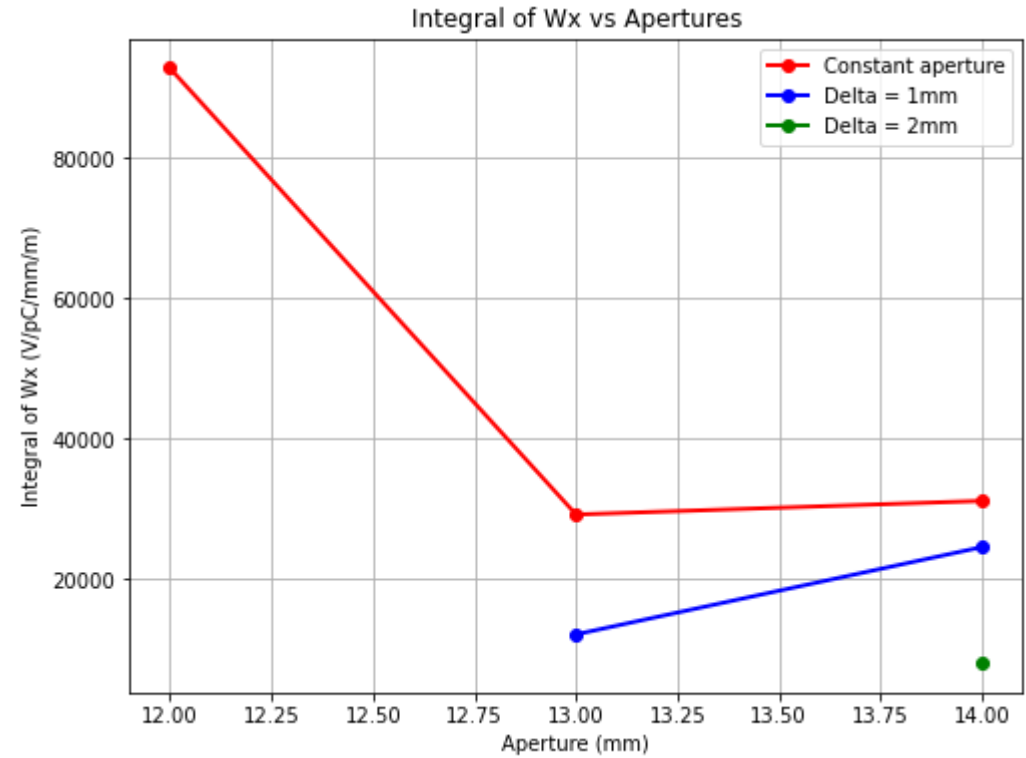
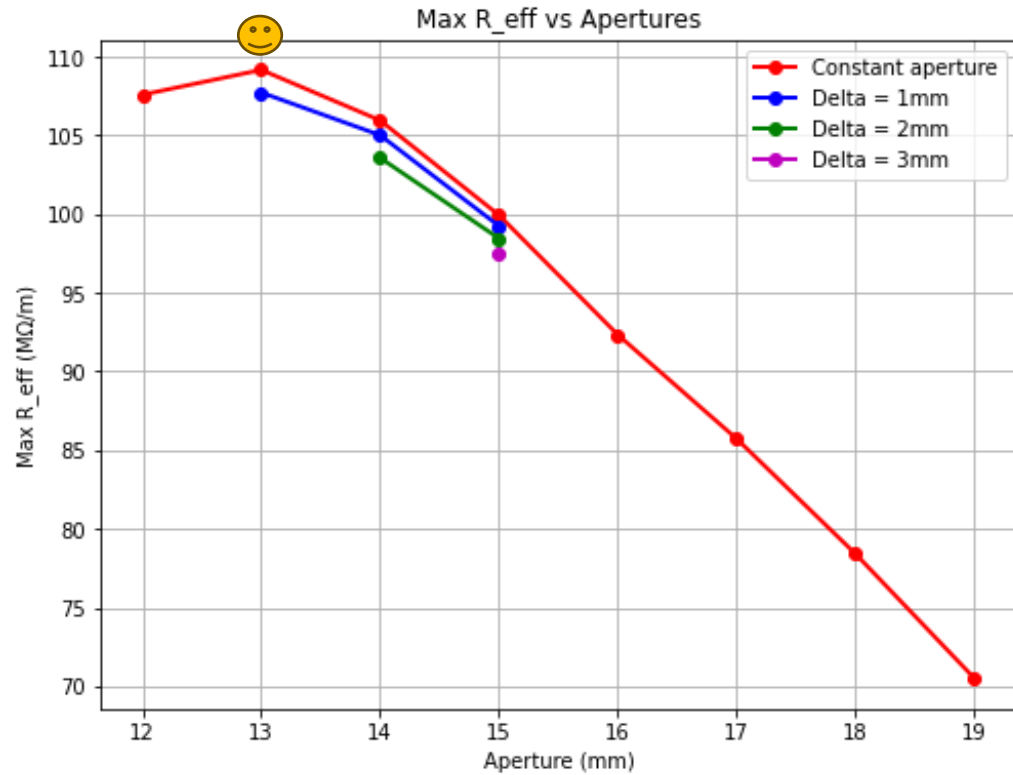
Adnan Kurtulus, Alexej Grudiev

CLIC Booster Linac scans – Constant Aperture

- Parameters for the structure:
- $f = 2$ GHz, Length = 3m, Phase advance = $2\pi/3$, $Q_{0,SLED} = 2e5$, $T_{klystron} = 5$ us, $G_{avg} = 25$ MV/m.



CLIC Booster Linac scans



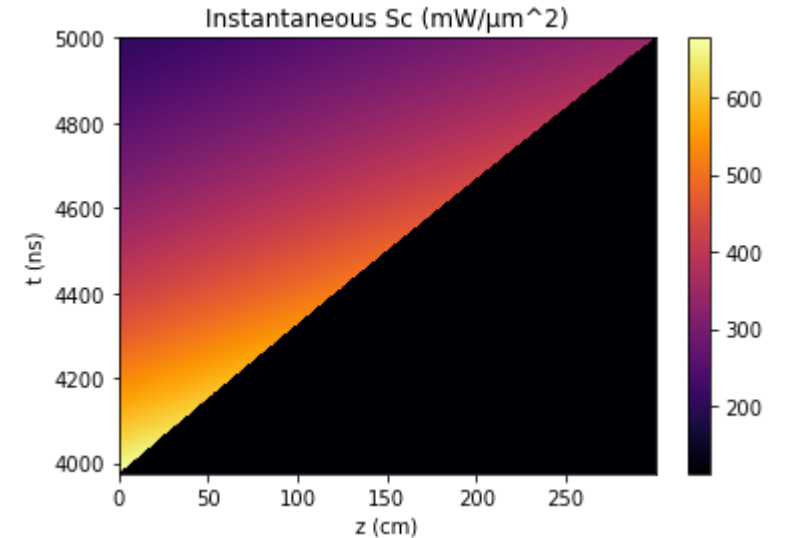
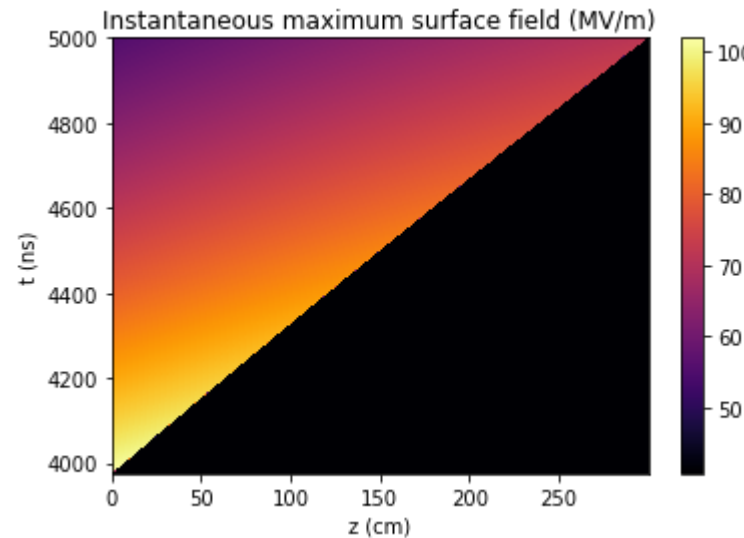
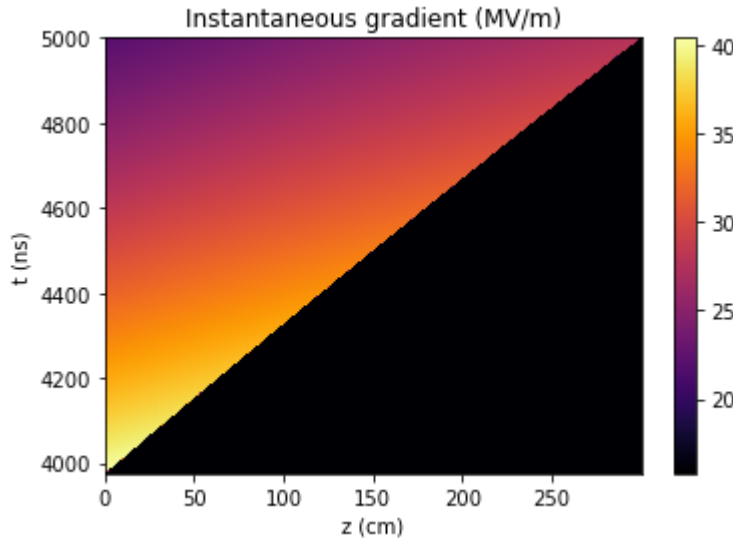
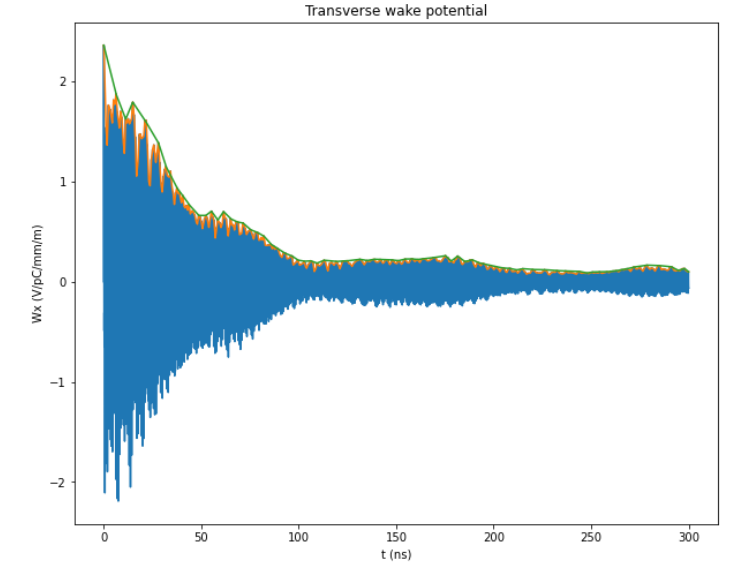
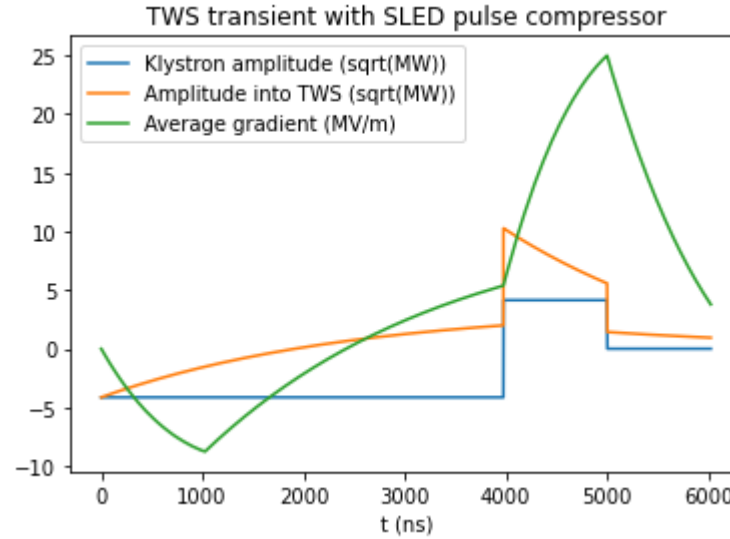
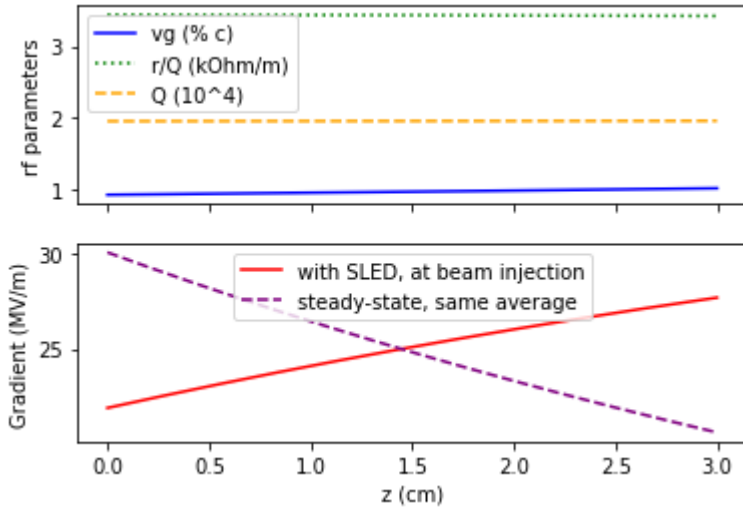
CLIC Booster Linac scans

Avg. Aperture = 13 mm	Constant aperture	Delta = 1mm
Entr., exit aperture	13 mm → 13 mm	14 mm → 12 mm
Iris thickness	3.46 mm → 2.86 mm	3.66 mm → 2.86 mm
Vg (% c)	0.93 → 1.02	1.16 → 0.79
r/Q (kOhm/m)	3.44 → 4.42	3.33 → 3.53
Q	19572 → 19617	19563 → 19602
Filling time	1025 ns	1049 ns
SLED coupling	12	11
Eff. shunt impedance	109 MΩ/m	108 MΩ/m
Integral of WT (V/pC/mm/m)	29229	12184
G_{avg}	26.2 MV/m	26.1 MV/m
Klystron power per structure	18.9 MW	18.9 MW
E_{max} (instant.)	102 MV/m	91 MV/m
$S_{c,max}$ (instant.)	677 mW/μm ²	584 mW/μm ²

Avg. Aperture = 14 mm	Constant aperture	Delta = 1mm	Delta = 2mm
Entr., exit aperture	14 mm → 14 mm	15 mm → 13 mm	16 mm → 12 mm
Iris thickness	4.46 mm → 3.26 mm	4.86 mm → 2.86 mm	5.06 mm → 2.86 mm
Vg (% c)	1.06 → 1.22	1.28 → 1.02	1.56 → 0.79
r/Q (kOhm/m)	3.32 → 3.33	3.19 → 3.42	3.07 → 3.53
Q	19419 → 19610	19348 → 19617	19321 → 19602
Filling time	884 ns	882 ns	914 ns
SLED coupling	13	13	12
Eff. shunt impedance	106 MΩ/m	105 MΩ/m	104 MΩ/m
Integral of WT (V/pC/mm/m)	31170	24611	8161
G_{avg}	25.8 MV/m	25.7 MV/m	25.5 MV/m
Klystron power per structure	18.9 MW	18.9 MW	18.9 MW
E_{max} (instant.)	93 MV/m	84 MV/m	87 MV/m
$S_{c,max}$ (instant.)	607 mW/μm ²	508 mW/μm ²	500 mW/μm ²

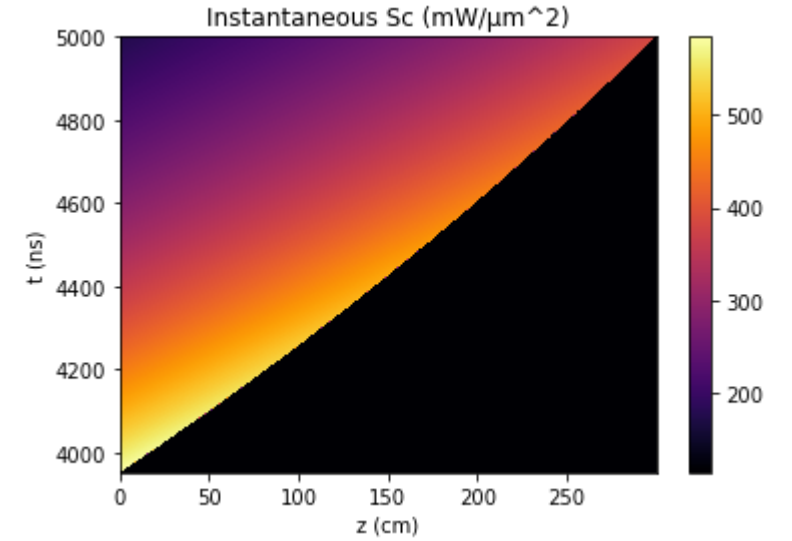
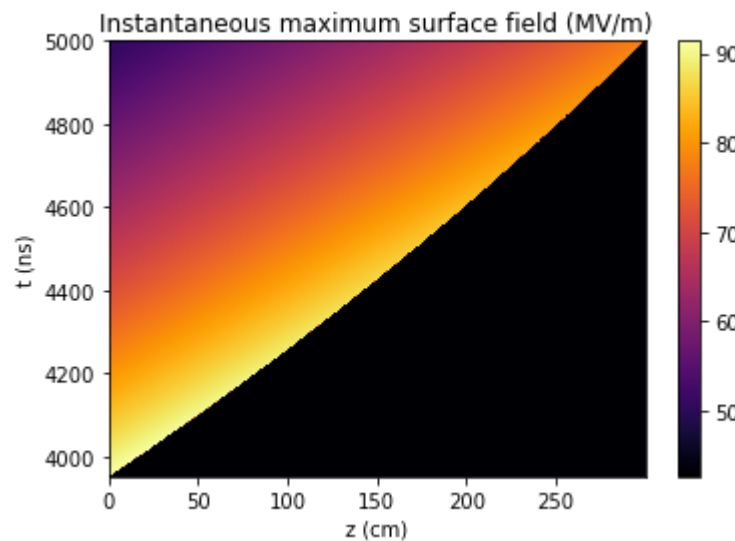
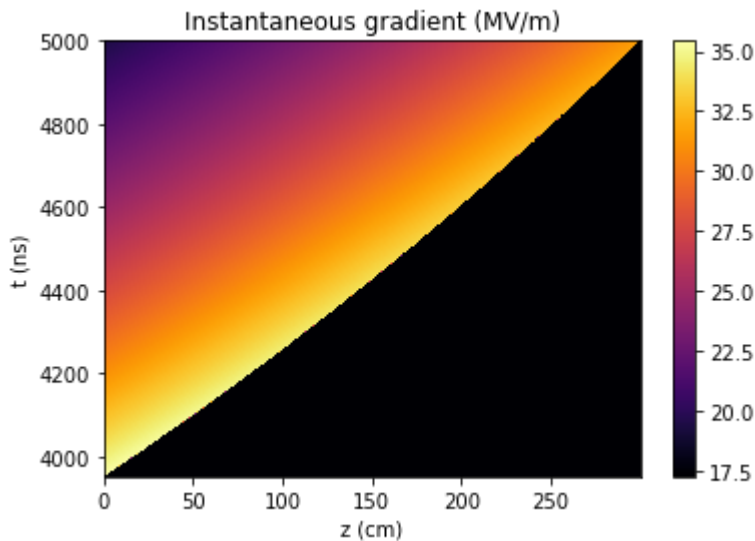
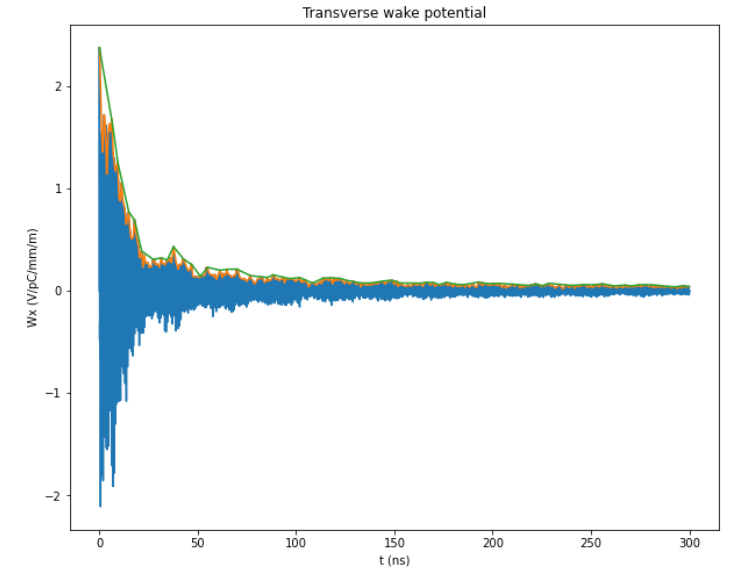
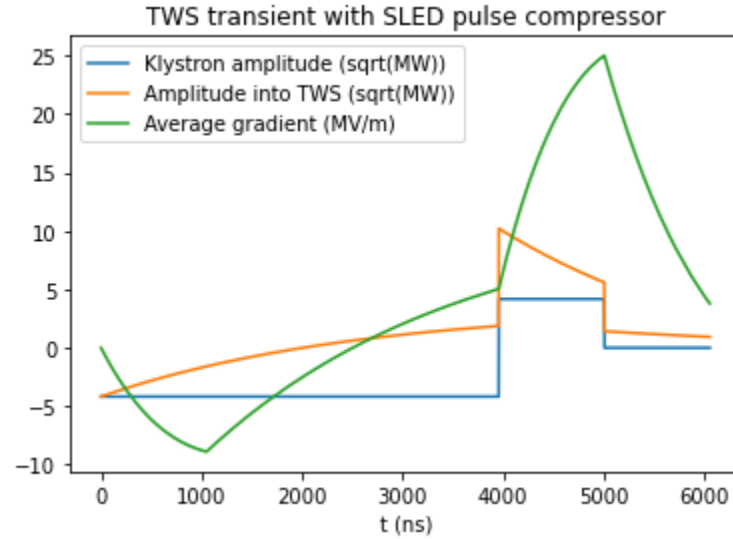
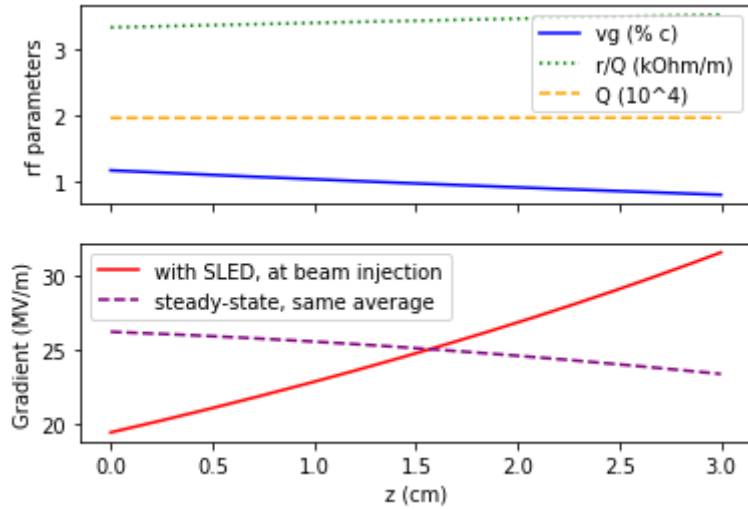
CLIC Booster Linac constant aperture structure

Example Structure: $\langle a \rangle = 13\text{mm}$ Constant: Effective Rsh = 109 M Ω /m



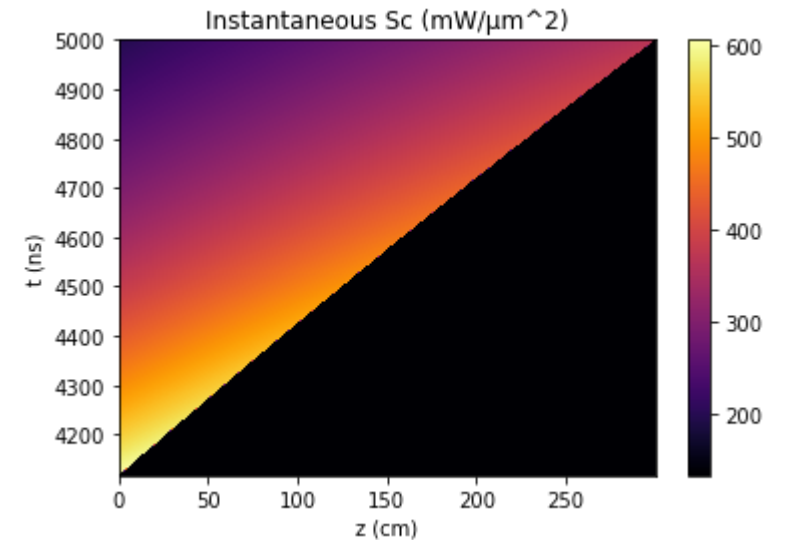
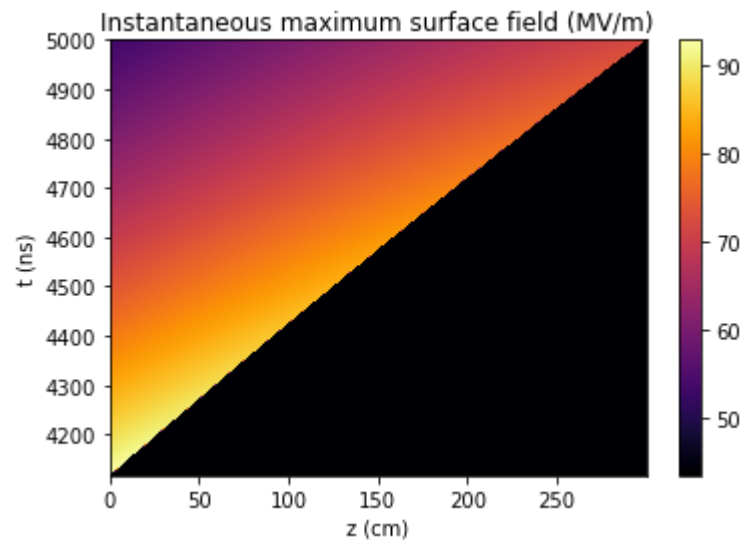
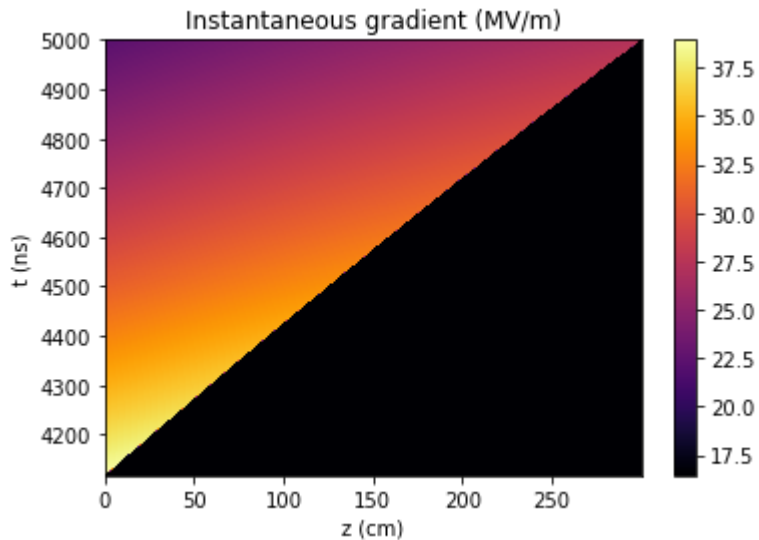
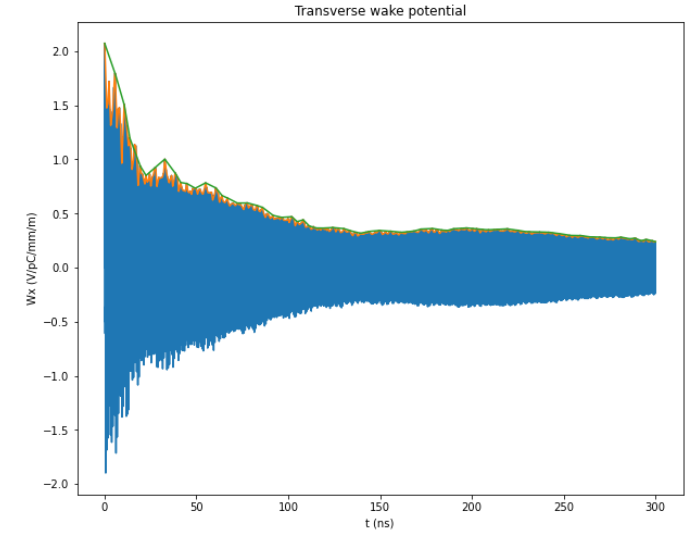
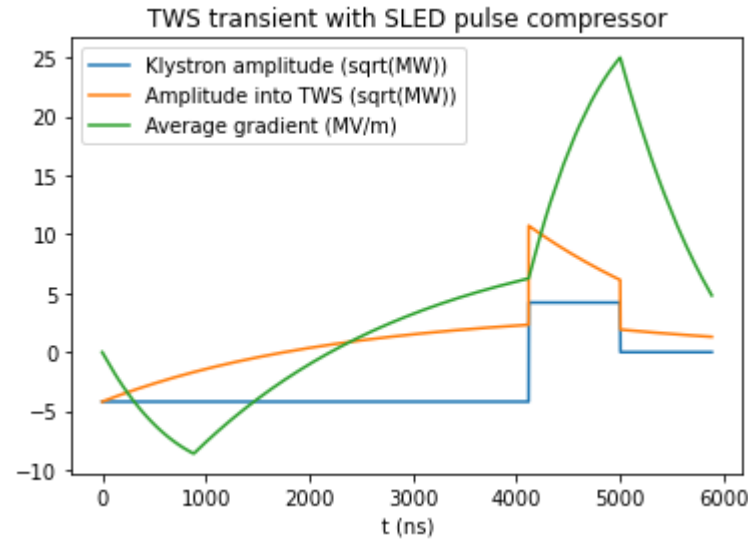
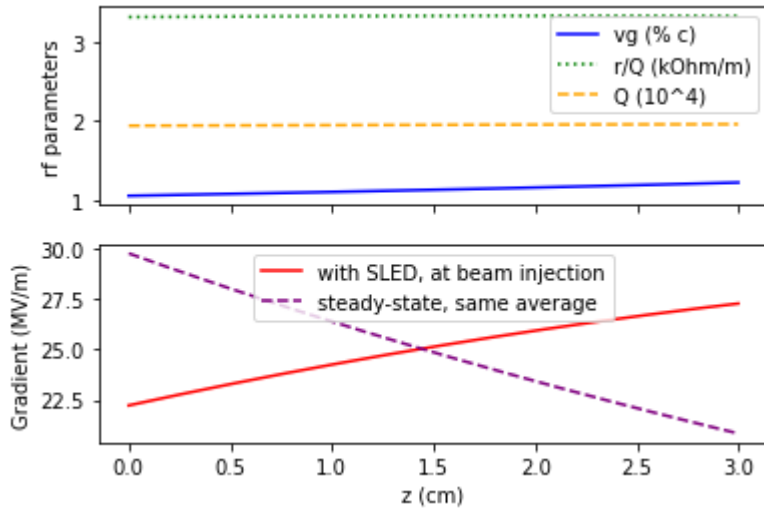
CLIC Booster Linac tapered structure

Example Structure: $\langle a \rangle = 13\text{mm}$ with $\Delta = 1\text{mm}$: Effective $R_{sh} = 108\text{ M}\Omega/\text{m}$



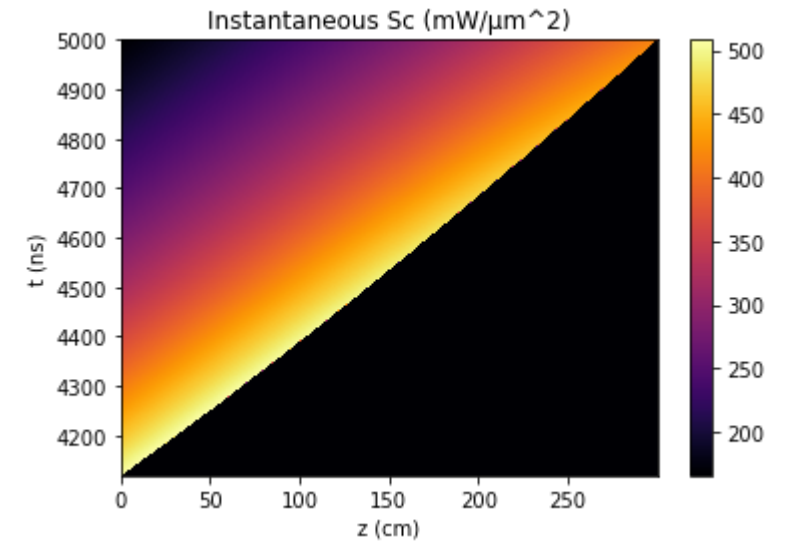
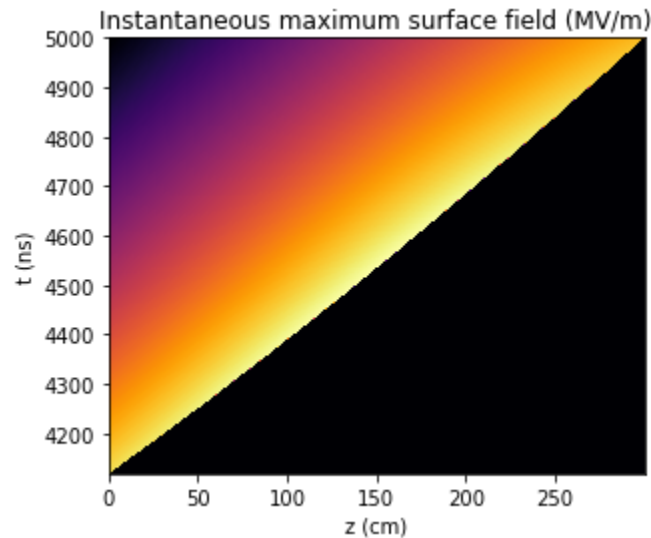
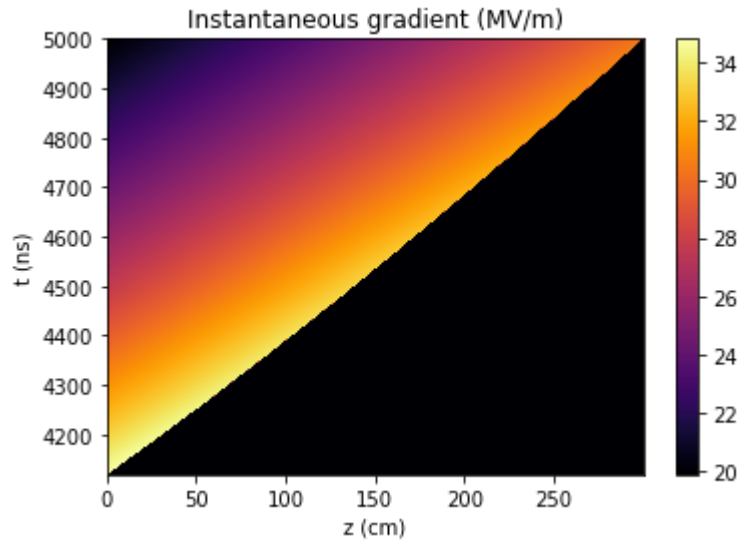
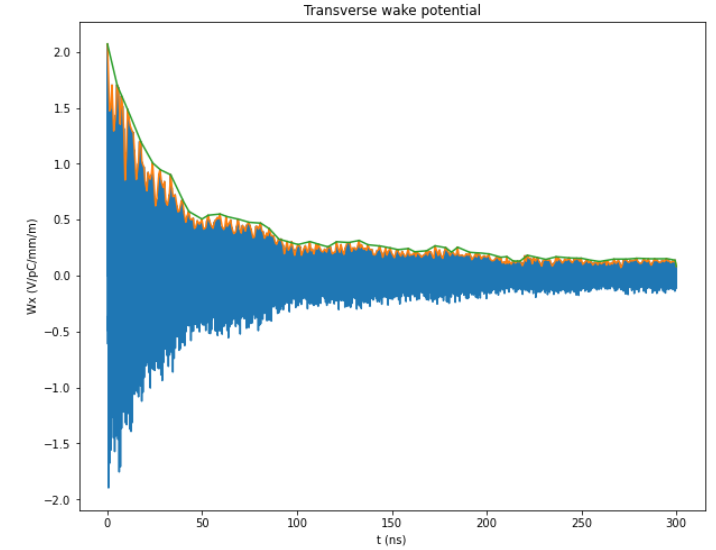
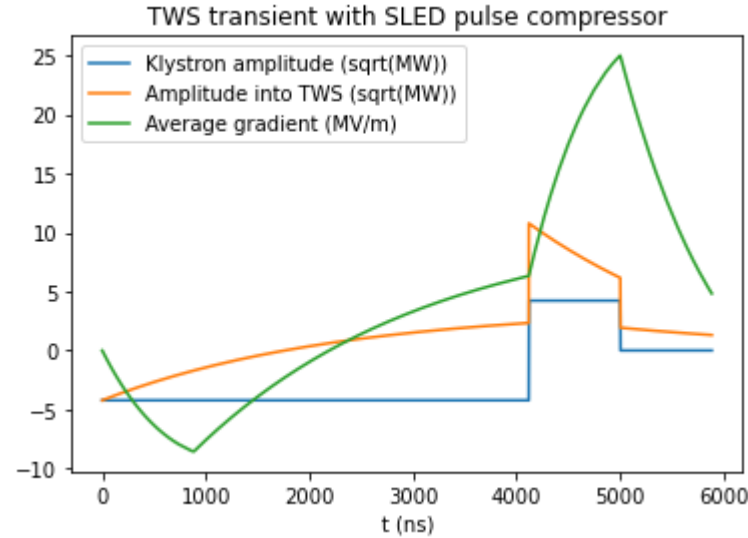
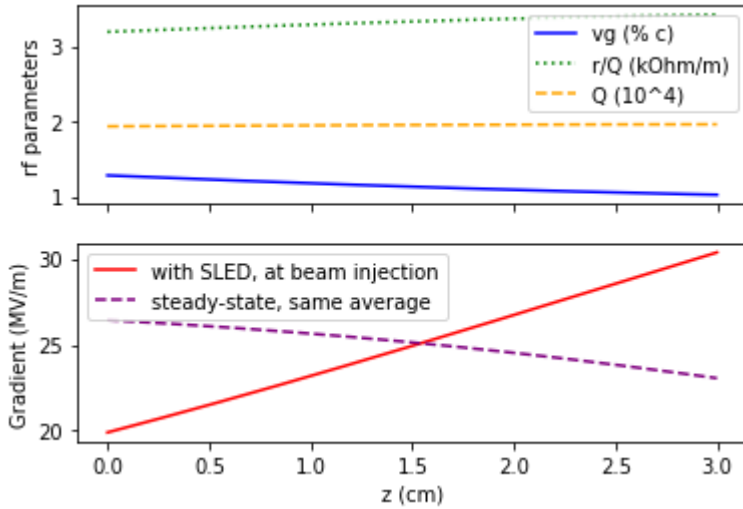
CLIC Booster Linac constant aperture structure

Example Structure: $\langle a \rangle = 14\text{mm}$ with Constant: Effective $R_{sh} = 105\text{ M}\Omega/\text{m}$



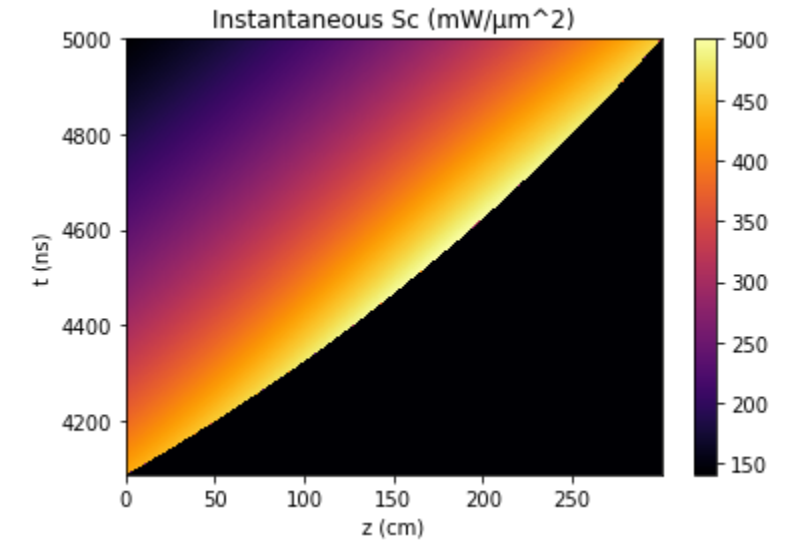
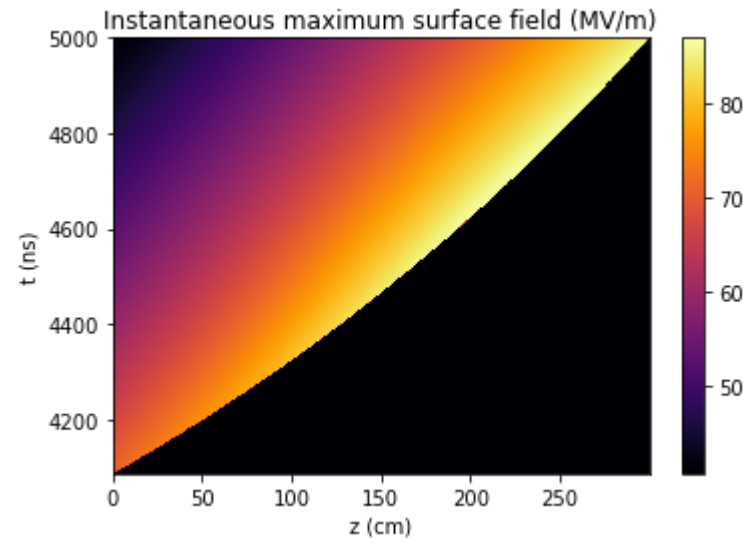
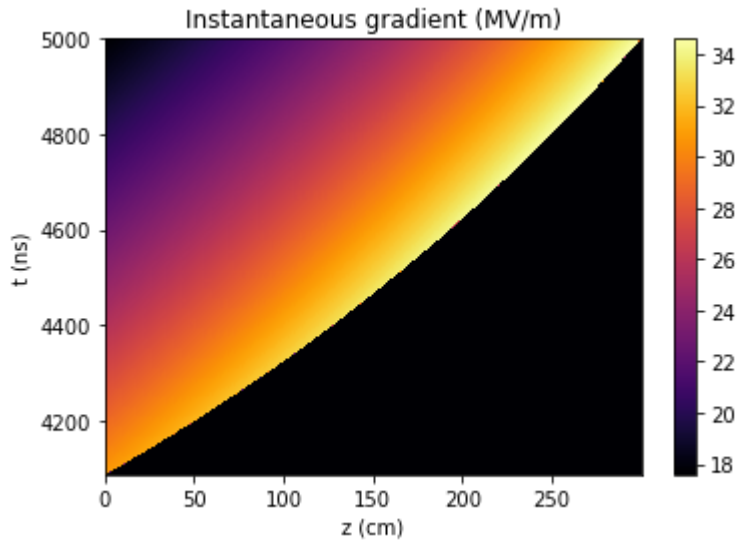
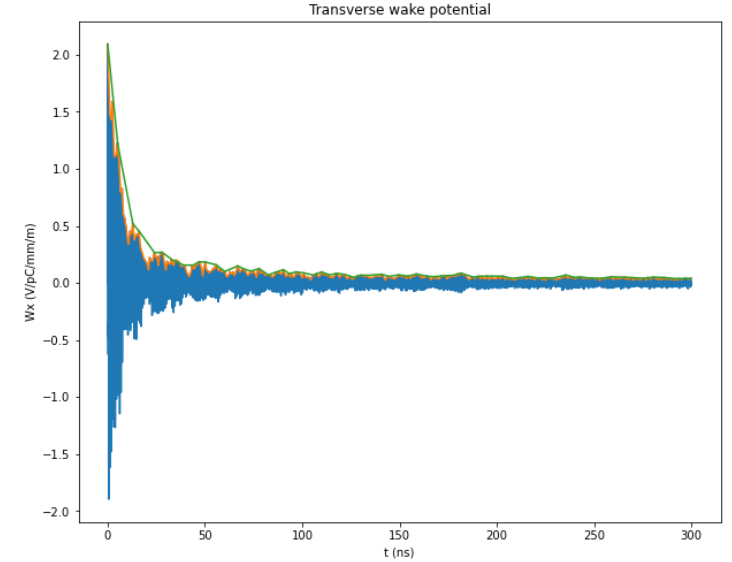
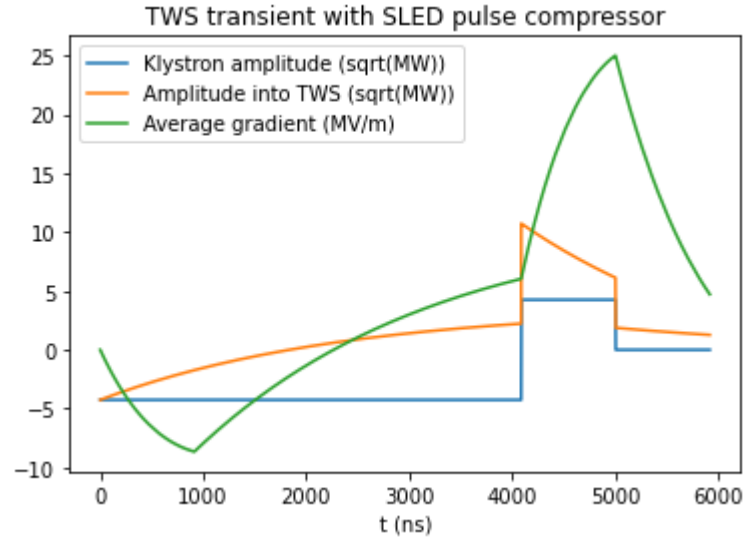
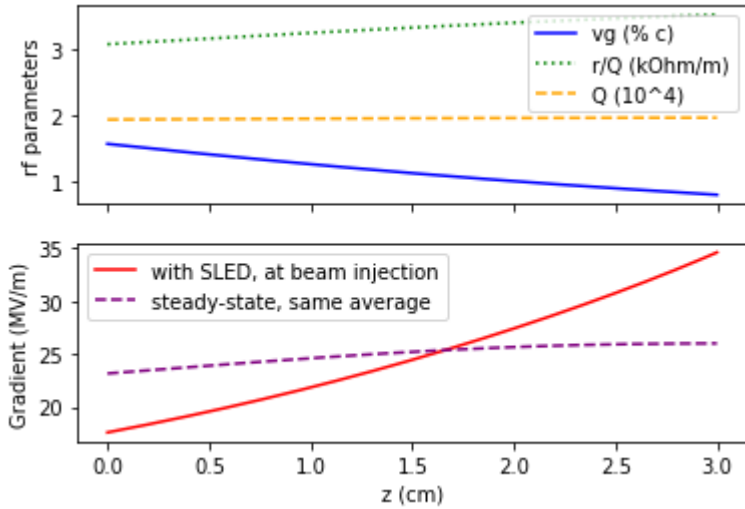
CLIC Booster Linac tapered structure

Example Structure: $\langle a \rangle = 14\text{mm}$ with $\Delta = 1\text{mm}$: Effective $R_{sh} = 105\text{ M}\Omega/\text{m}$



CLIC Booster Linac tapered structure

Example Structure: $\langle a \rangle = 14\text{mm}$ with $\Delta = 2\text{mm}$: Effective $R_{sh} = 104\text{ M}\Omega/\text{m}$



Spare Slides

CLIC Booster Linac scans

