

Some comments on the CLIC0 Main Beam

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Example Parameters

- Assume
 - 3TeV structure
 - 50 quadrupoles
 - 150 super-structures,
 - 250um bunch length
- For 0.25GeV initial energy can accept
 - 0.6mm RMS beam size for $\epsilon=30\mu\text{m}$
 - Large compared to the acceptance
- Assume reduced emittance
 - 0.15mm RMS beam size for $\epsilon=2\mu\text{m}$
 - Still a large beam
 - Can accept $0.4 \times 3.7 \times 10^9$ particles
 - Amplification of jitter emittance -> 4.5
 - 3.5um cavity scatter -> 0.09nm
 - 14um BPM scatter -> 3.5nm

Example Parameters

- Use 2GeV initial energy and $\epsilon=2\mu\text{m}$
 - RMS beam size is $55\mu\text{m}$
 - Looks reasonable
 - Can tolerate $1.0*3.7\text{e}9$ particles
 - Amplification of jitter emittance $\rightarrow 3.75$
 - $3.5\mu\text{m}$ cavity scatter $\rightarrow 0.12\text{nm}$
 - $14\mu\text{m}$ BPM scatter $\rightarrow 11\text{nm}$
- Still the emittance is large compared to the growth
- Linac length may be marginal for test of ballistic alignment

Example Parameters, No Acceleration

- 0.25GeV initial energy, $\epsilon=2\mu\text{m}$
 - Can afford $0.05*3.7\text{e}9$ particles
 - Amplification of jitter emittance -> 4.5
 - 3.5um cavity scatter -> 0.015nm
 - 14um BPM scatter -> 1.6nm
 - Could increase energy spread
- 2GeV initial energy, $\epsilon=2\mu\text{m}$
 - Can afford $0.5*3.7\text{e}9$ particles
 - Amplification of jitter emittance -> 4.5
 - 3.5um cavity scatter -> 0.25nm
 - 14um BPM scatter -> 14nm