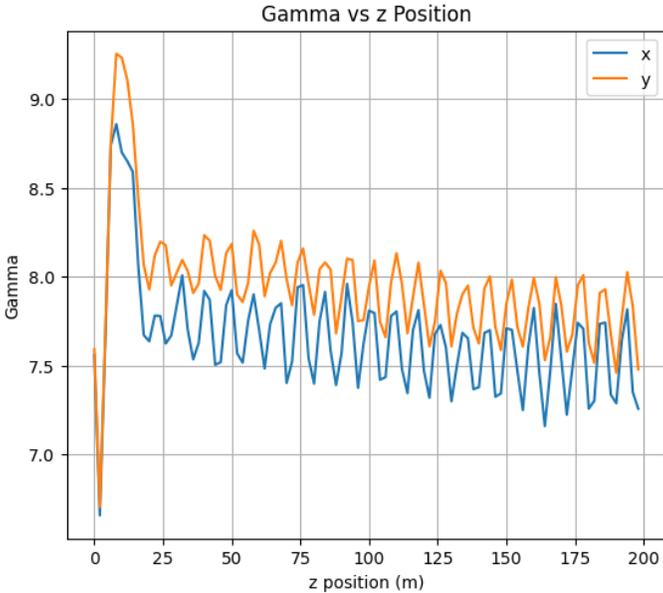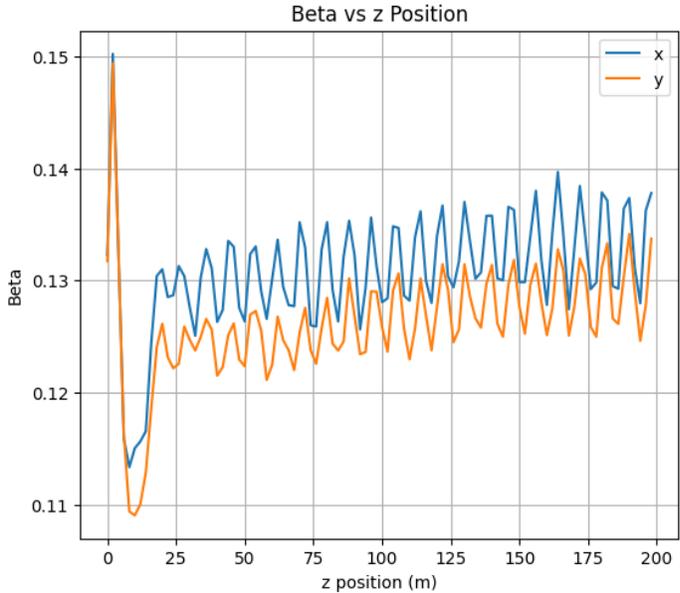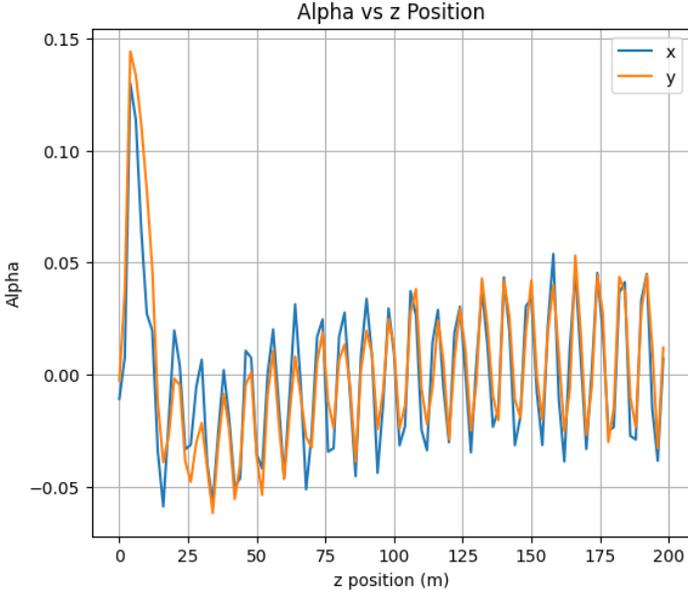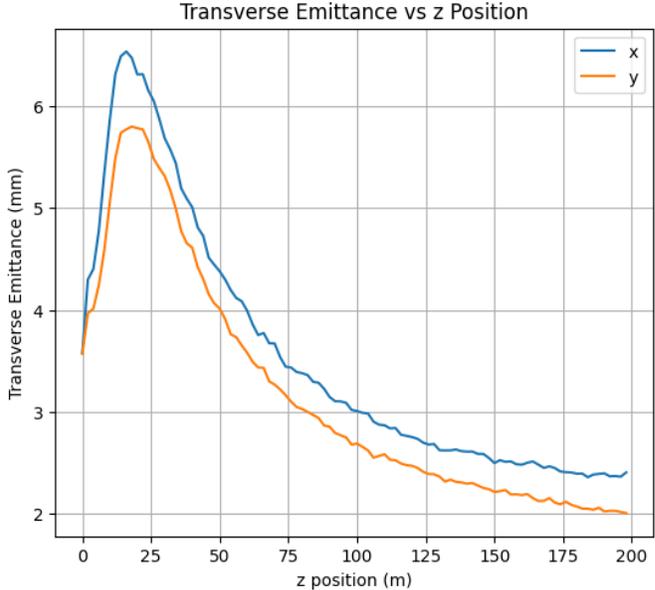# Demo study updates

In progress
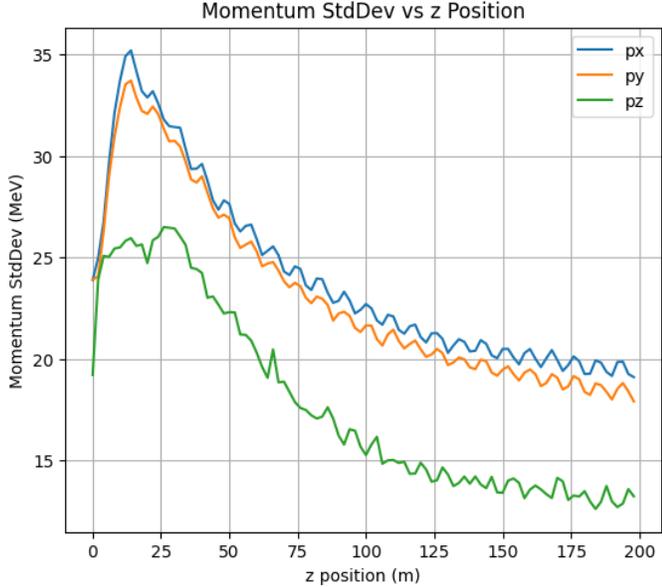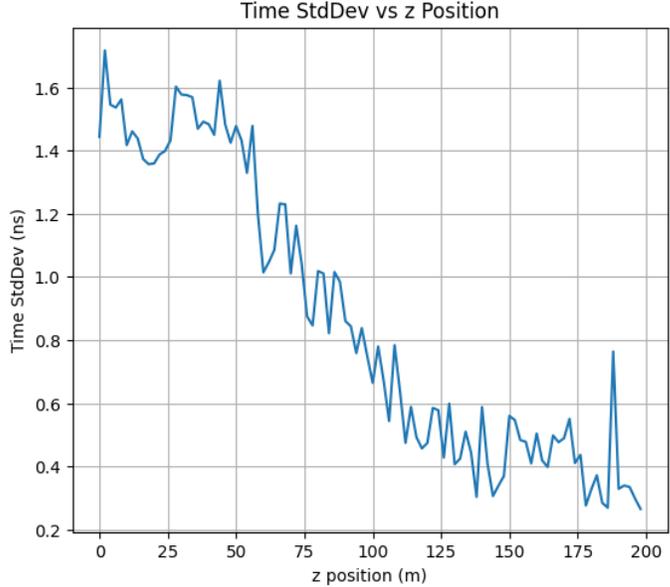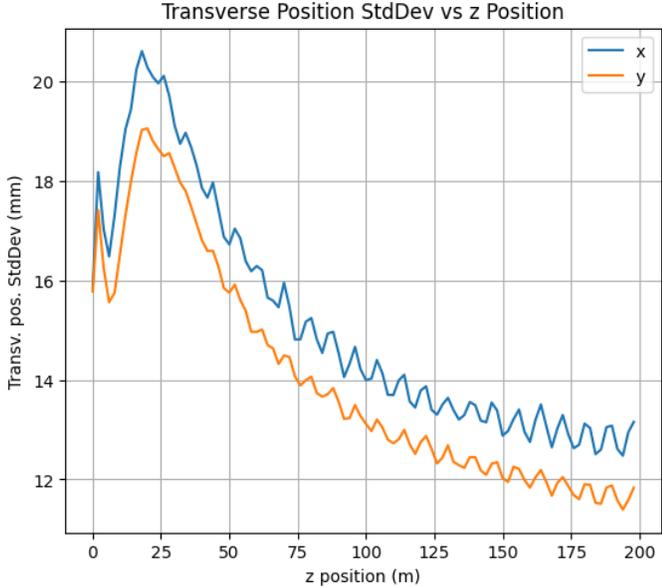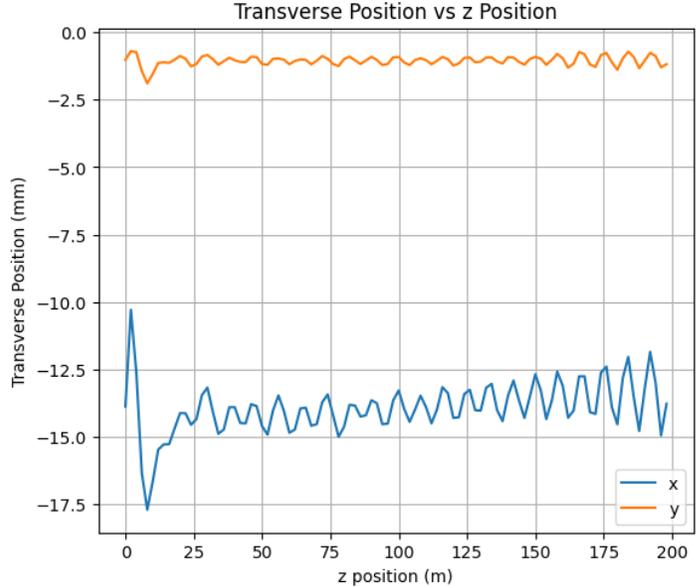
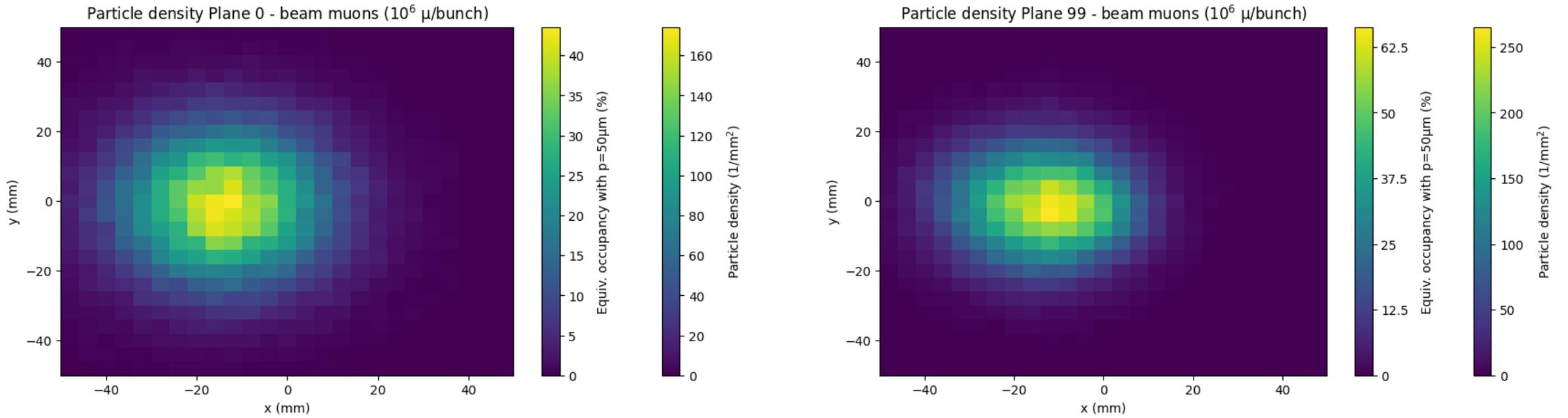# Beam emittance evolution
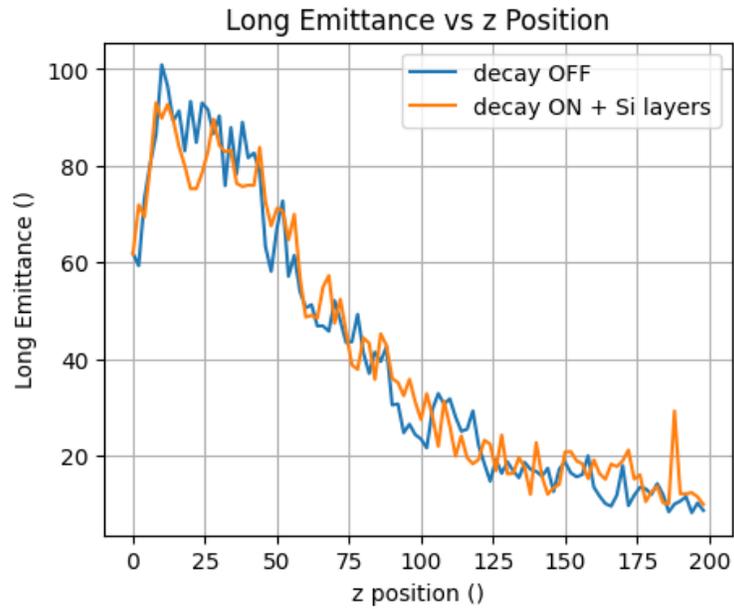
# Beam parameters evolution

Beam parameters evolution (2)

Preliminary particle densities

- Using pitch = 50 µm and a cluster size = 1 as 0th-order evaluation (~okay-ish for muons)

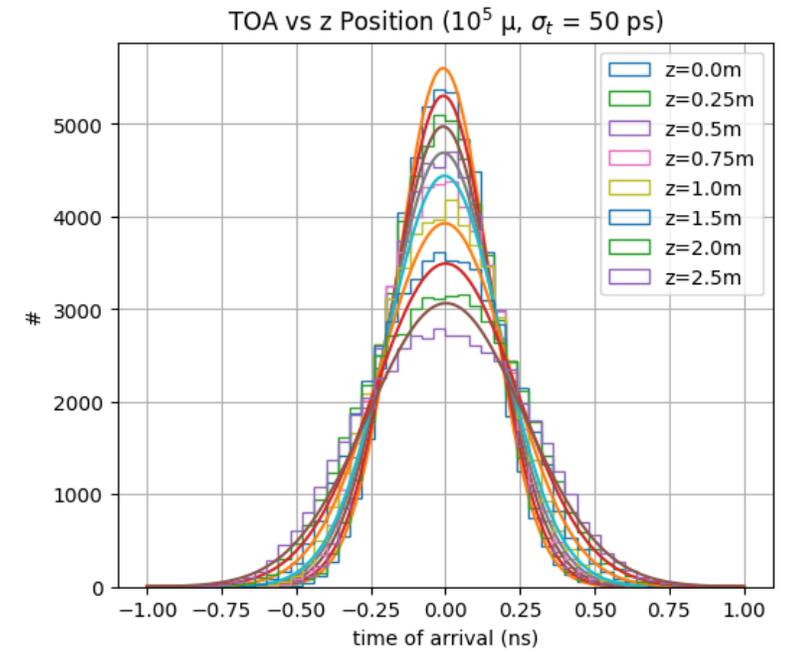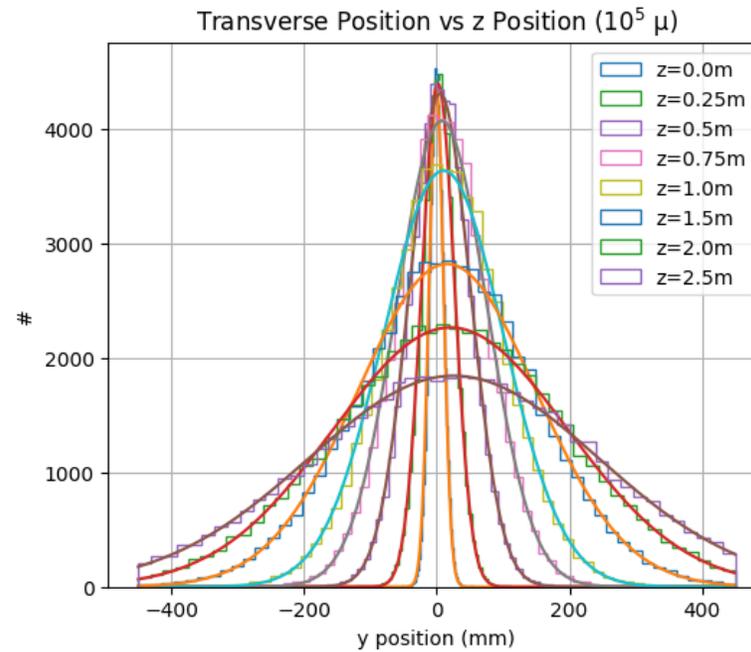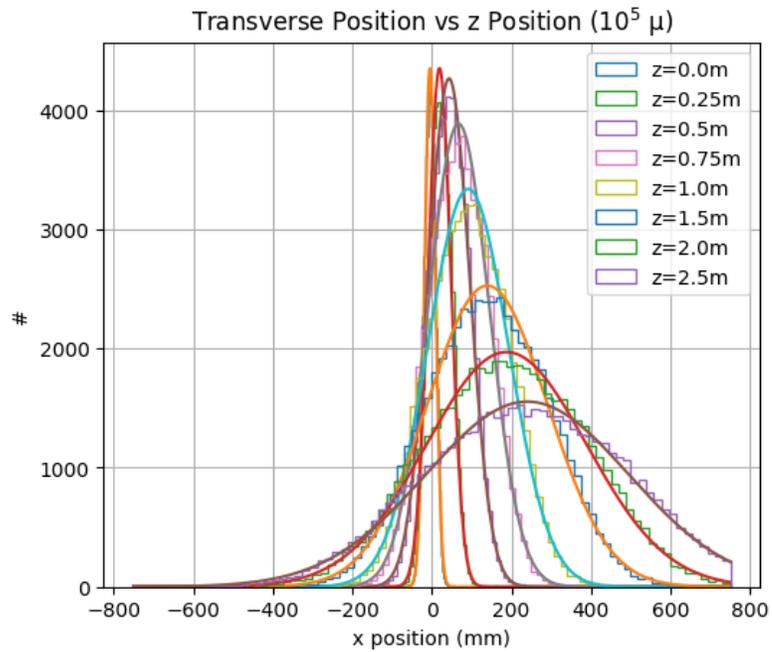# Preliminary particle densities (2)

- Using pitch = 50 μm and a cluster size = 1 as 0th-order evaluation → more complex for electrons, will need a more detailed evaluation when we have a final sensor layout
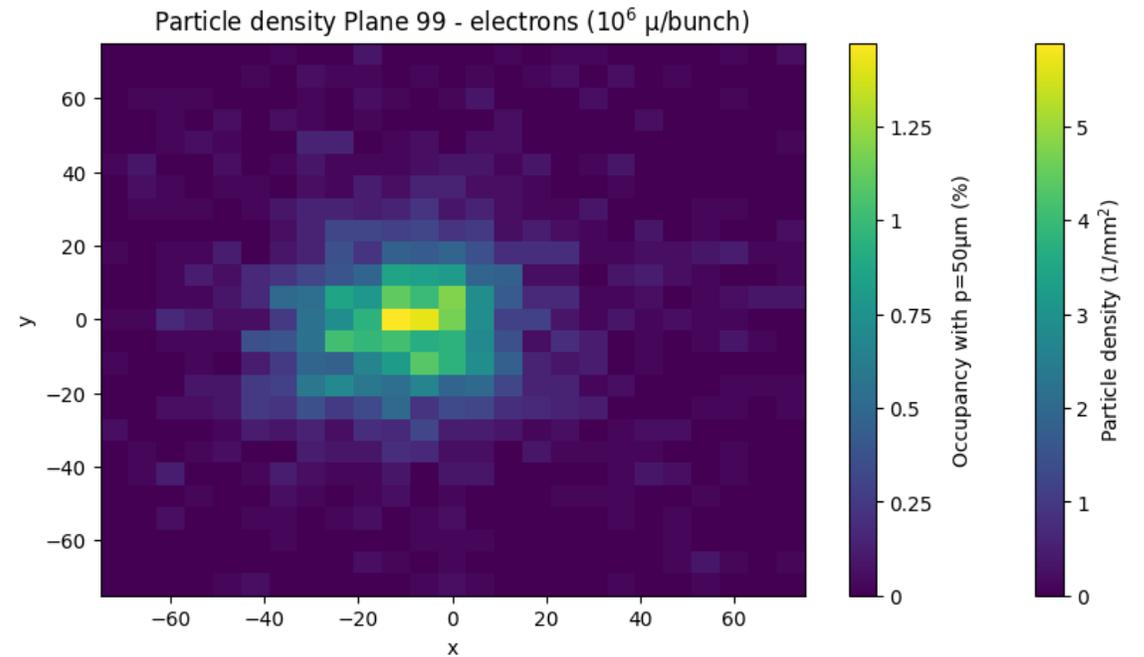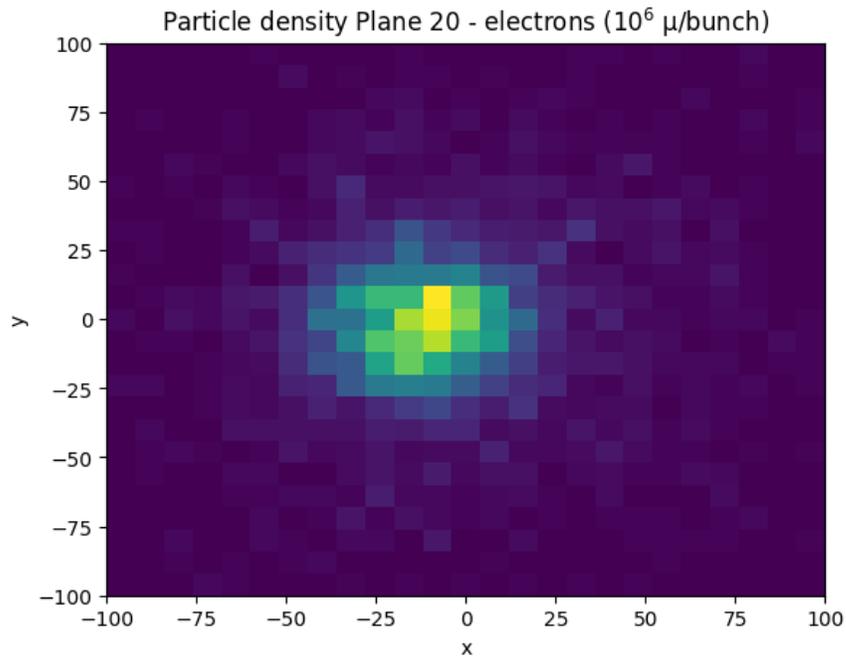
Endplanes to measure final emittance

- Virtual planes after the last cell, 0.25m steps, gaussian fit to the spatial distributions
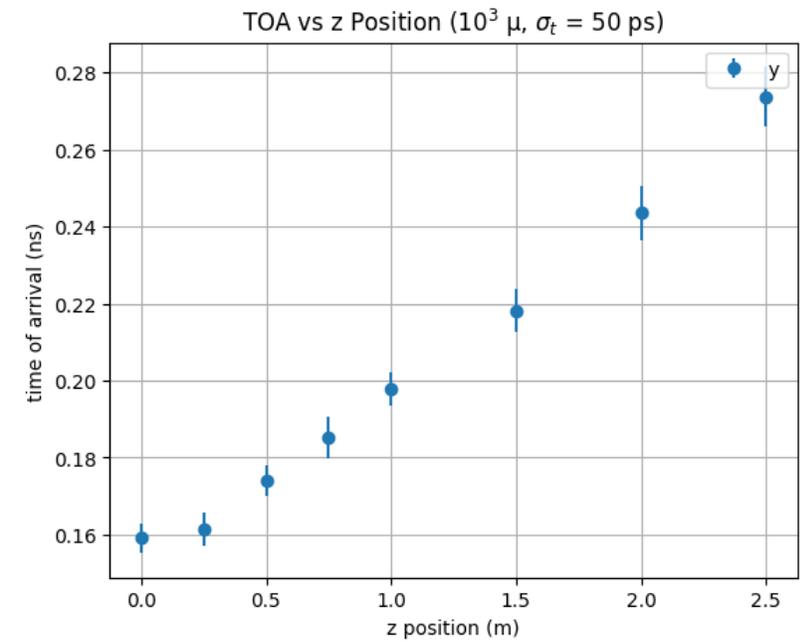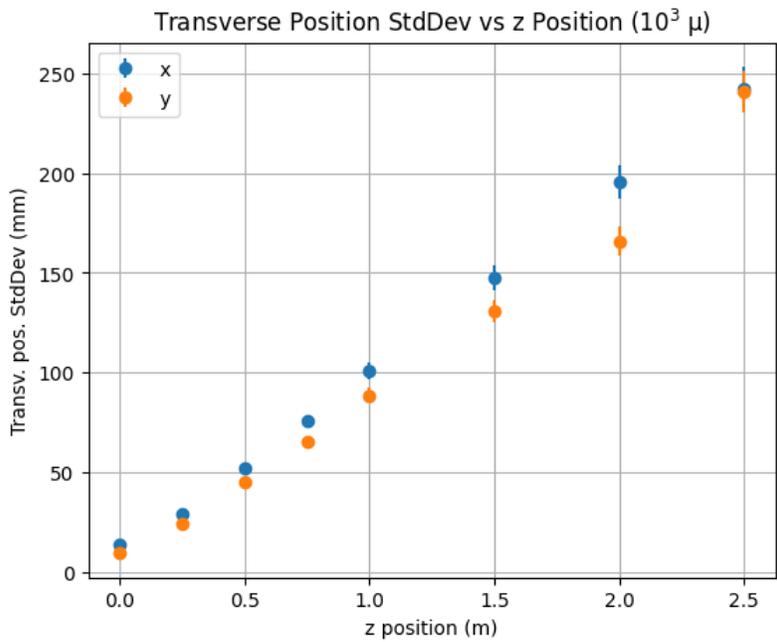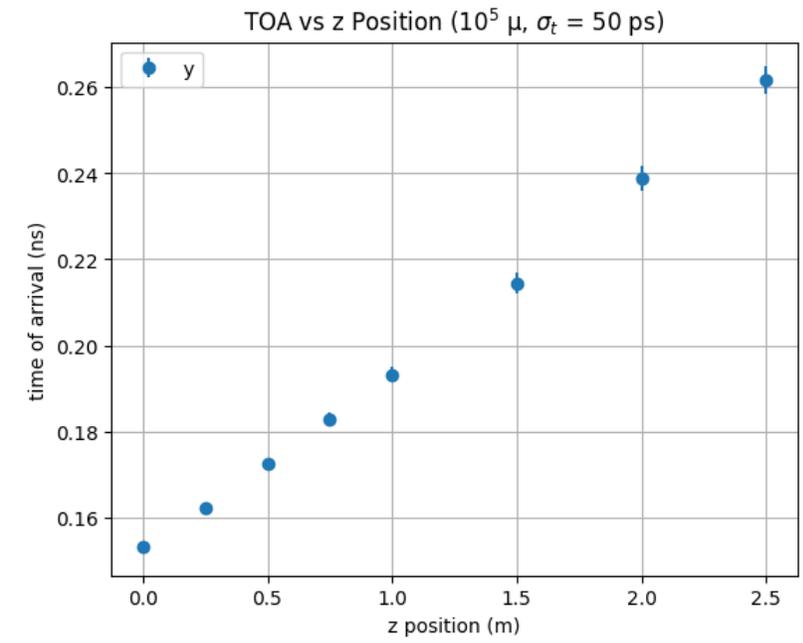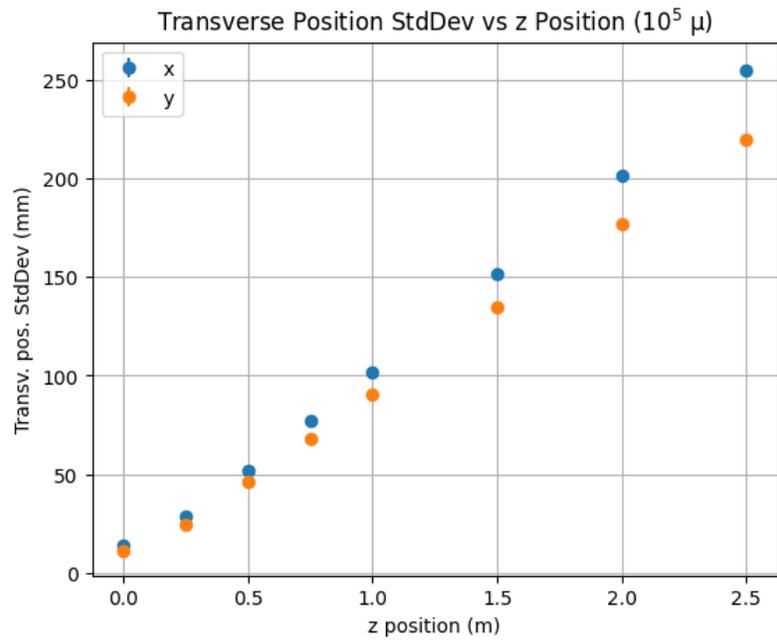- Assumed σ_t = 50 ps

Endplanes to measure final emittance (2)

- Check uncertainty in StdDev measurement (separate x,y measurements) for different numbers of muons

$$V[x] \rightarrow V[x] + \Delta z^2 \, V[p_x/p_z]$$

$$V[t] \rightarrow V[t] + (\Delta z^2/v_z^4) \, V[v_z] + O(10\%)$$

Example: longitudinal emittance comparing initial and final planes

- 3m of lattice without cooling before the actual cooling, same at the end
- In the x-y plane, only transverse evolution in solenoidal field
- In the t domain, StdDev growth
- The price is an even worse mismatch (if no optimization is done)