

Beam interaction with a single mode wake-field

Zakaryan Samvel

Topics

- Problem definition
- Calculation results
- Next steps

Problem definition

Study of micro-bunching of a beam after passing through a single mode waveguide

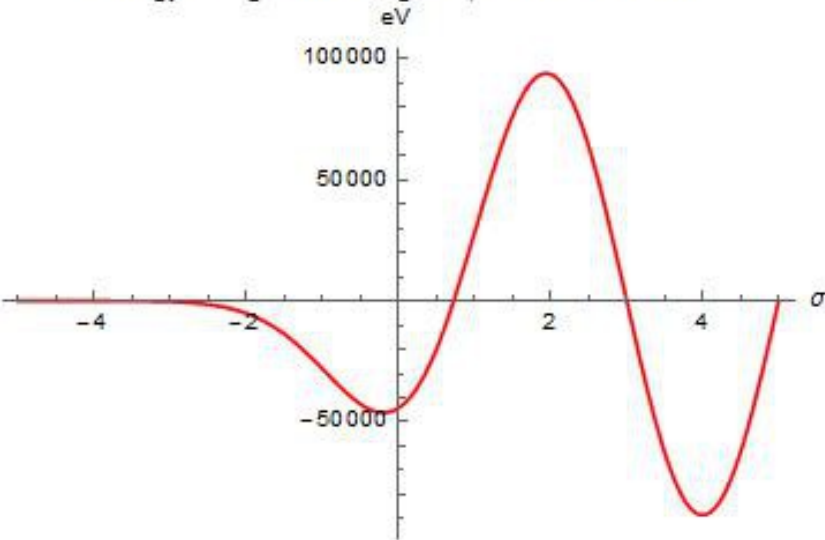
Problem definition

Beam energy	1 MeV
Charge	100 pC
Waveguide length	10 cm
Waveguide mode	10 μm

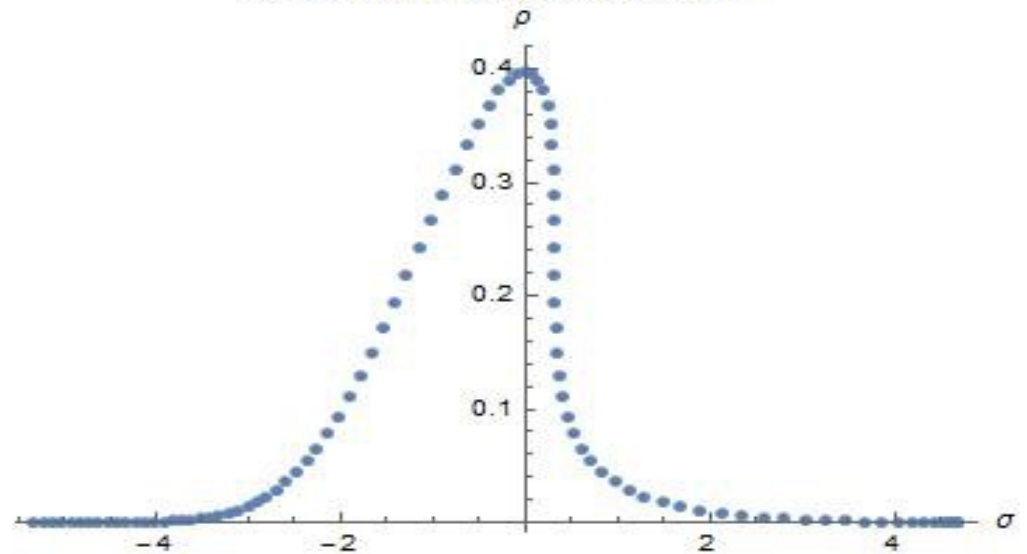
$$\text{Wake } -w_z = k_{loss} \cos(\omega\tau)$$

Gaussian bunch

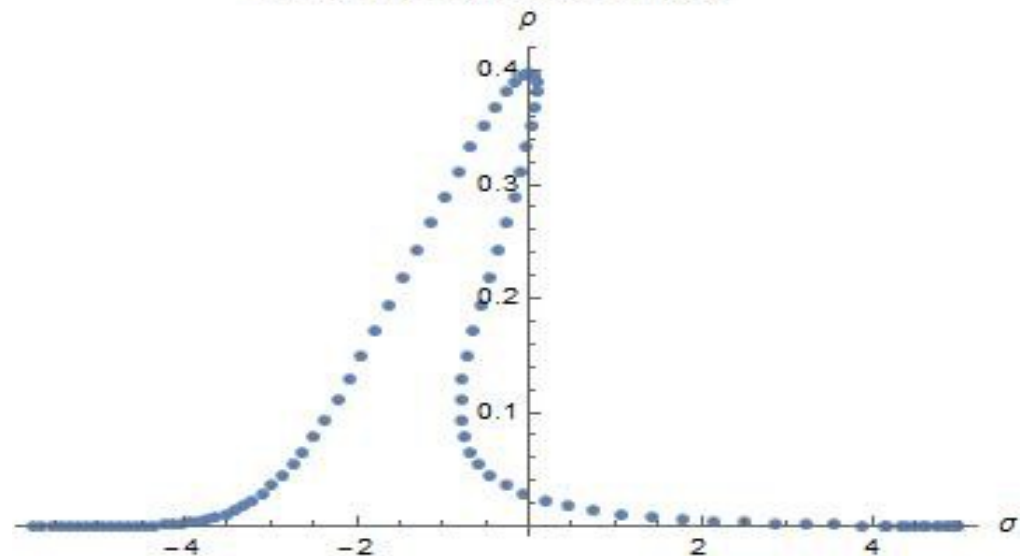
Energy change in a waveguide, $\sigma = 0.25 \times 10^{-5} \text{ m}$



Bunch distribution after 0.5 m drift

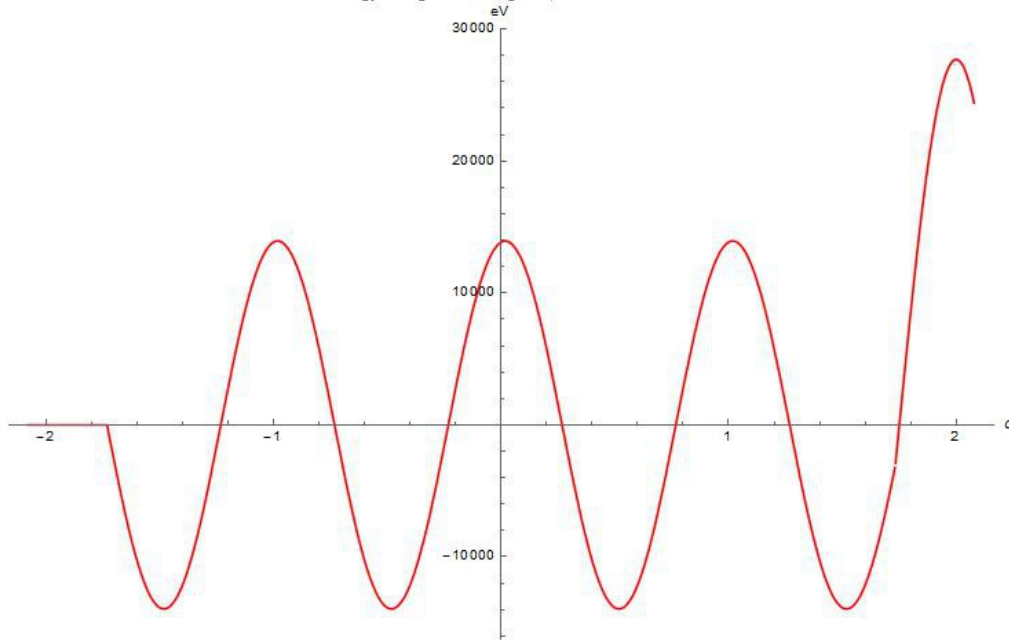


Bunch distribution after 1 m drift

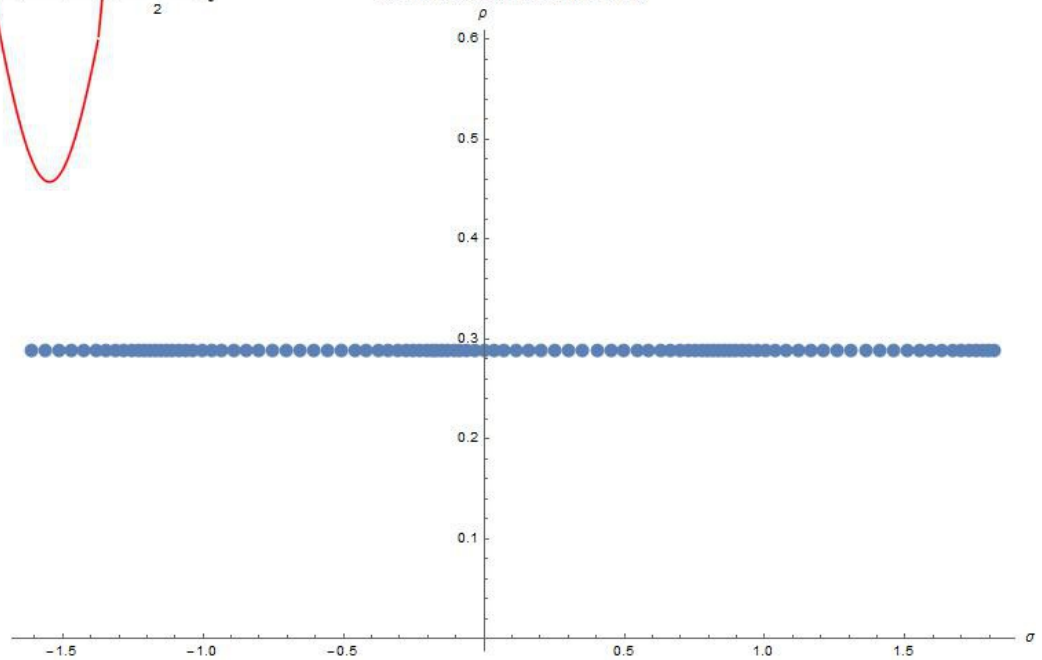


Uniform bunch

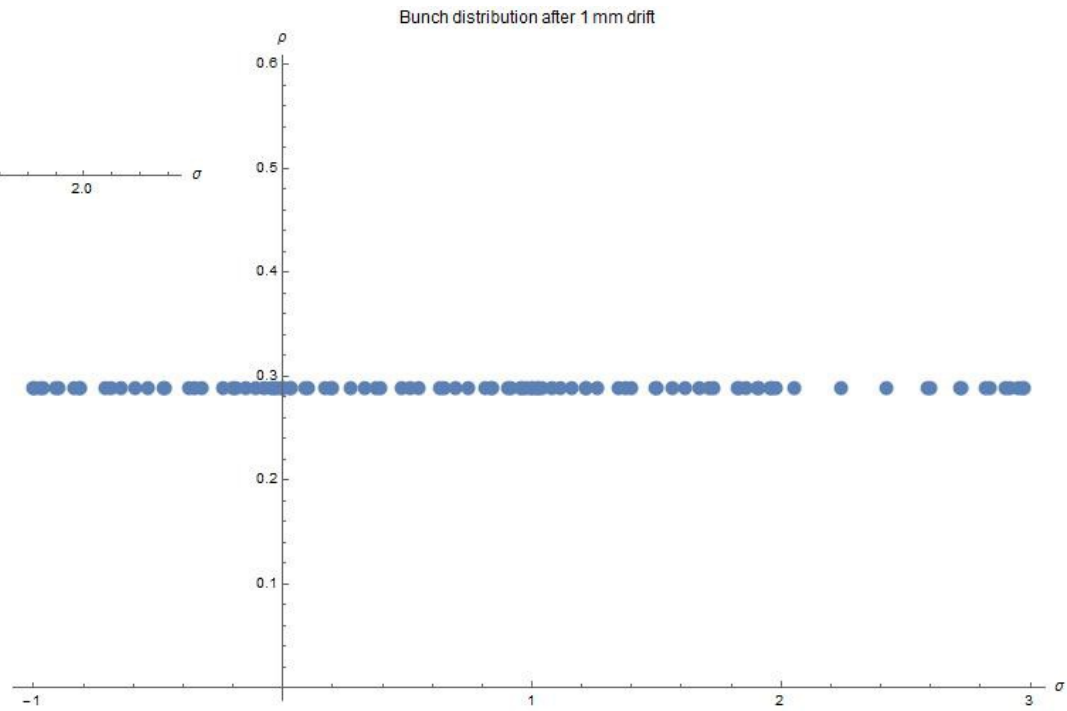
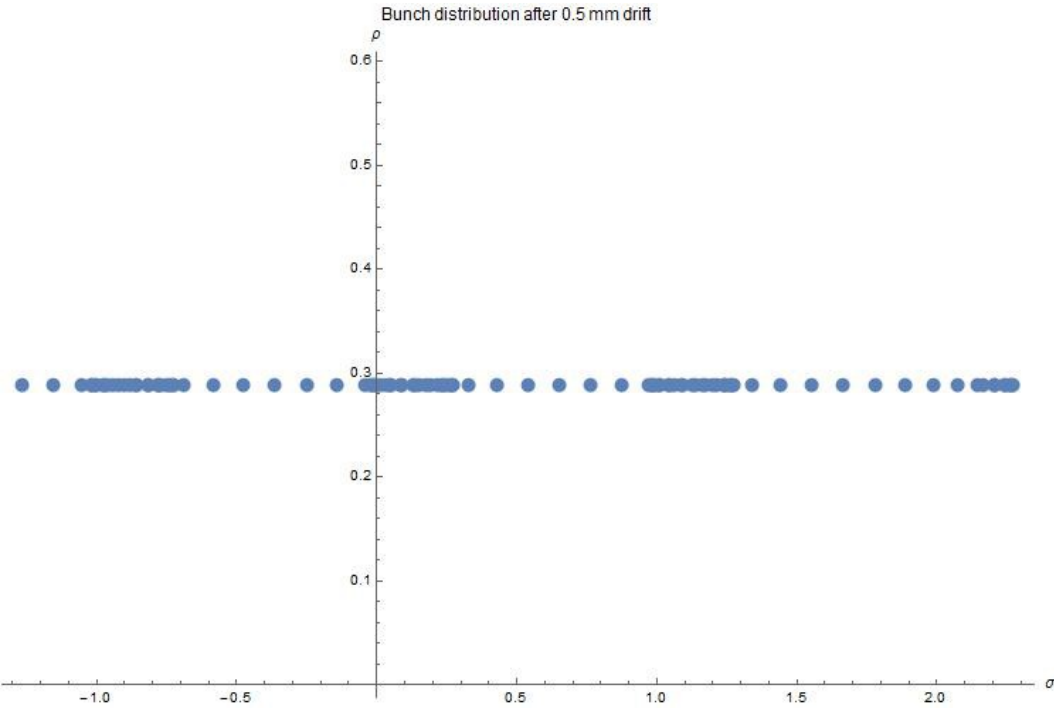
Energy change in a waveguide, $\sigma = 10 \cdot 10^{-8} \text{ m}$



Bunch distribution after 0.1 mm drift

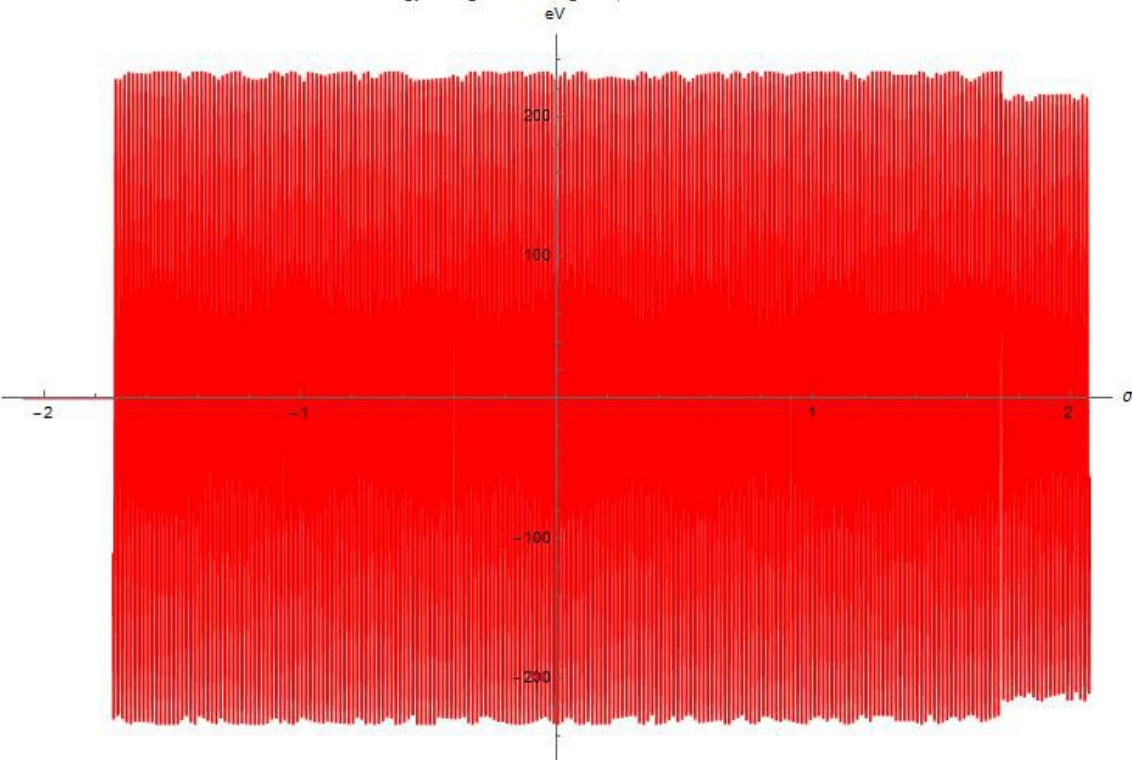


Uniform bunch

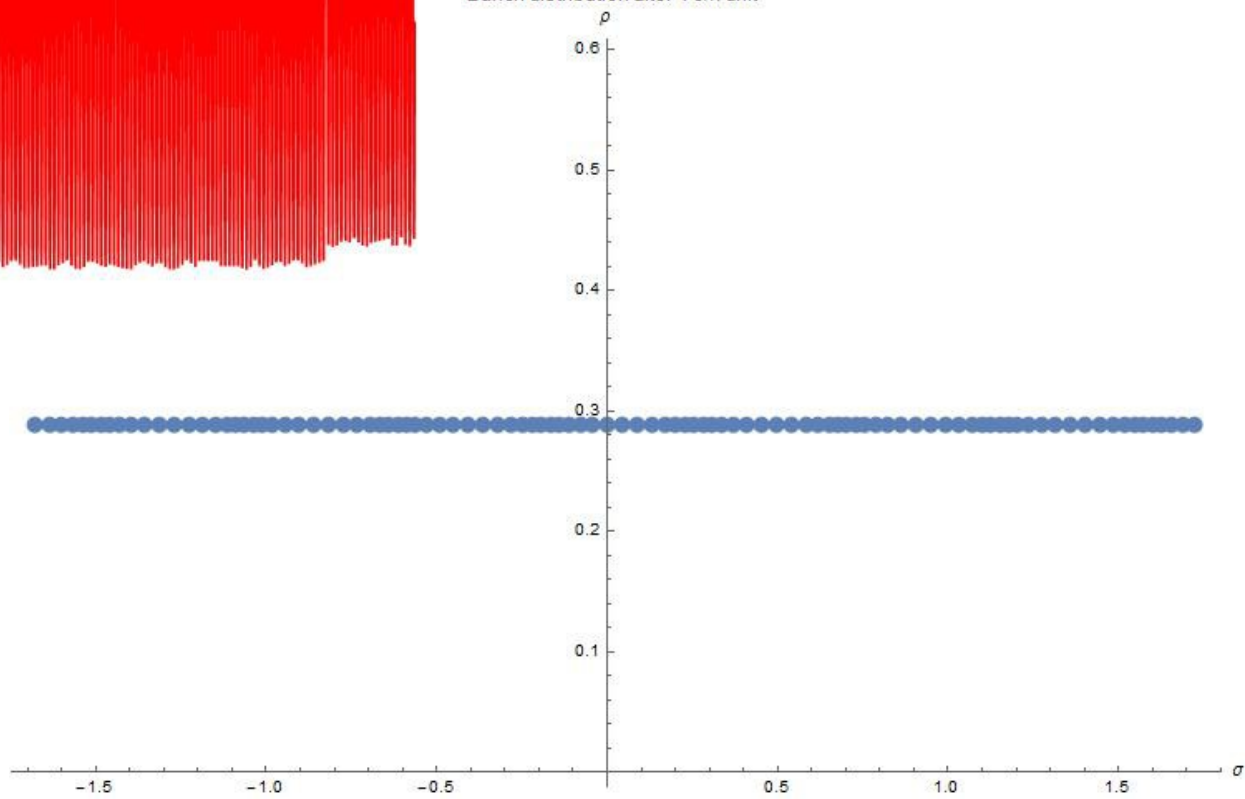


Uniform bunch

Energy change in a waveguide, $\sigma = 6 \times 10^{-4} m$

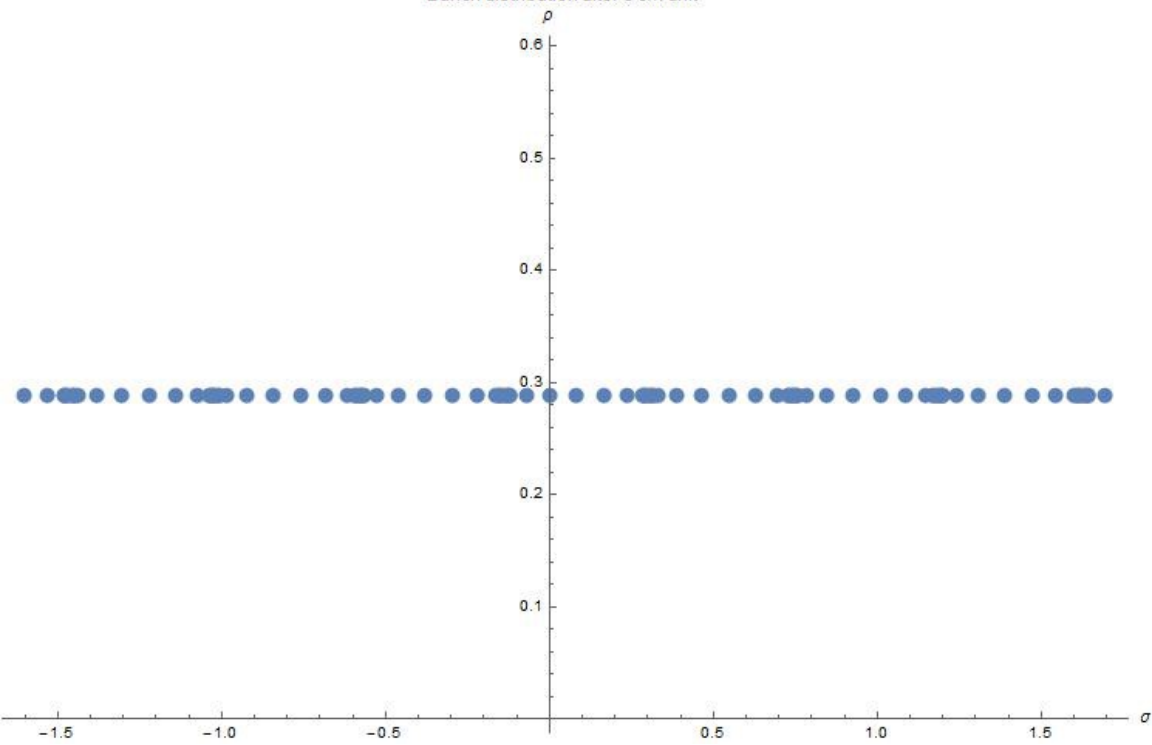


Bunch distribution after 1 cm drift

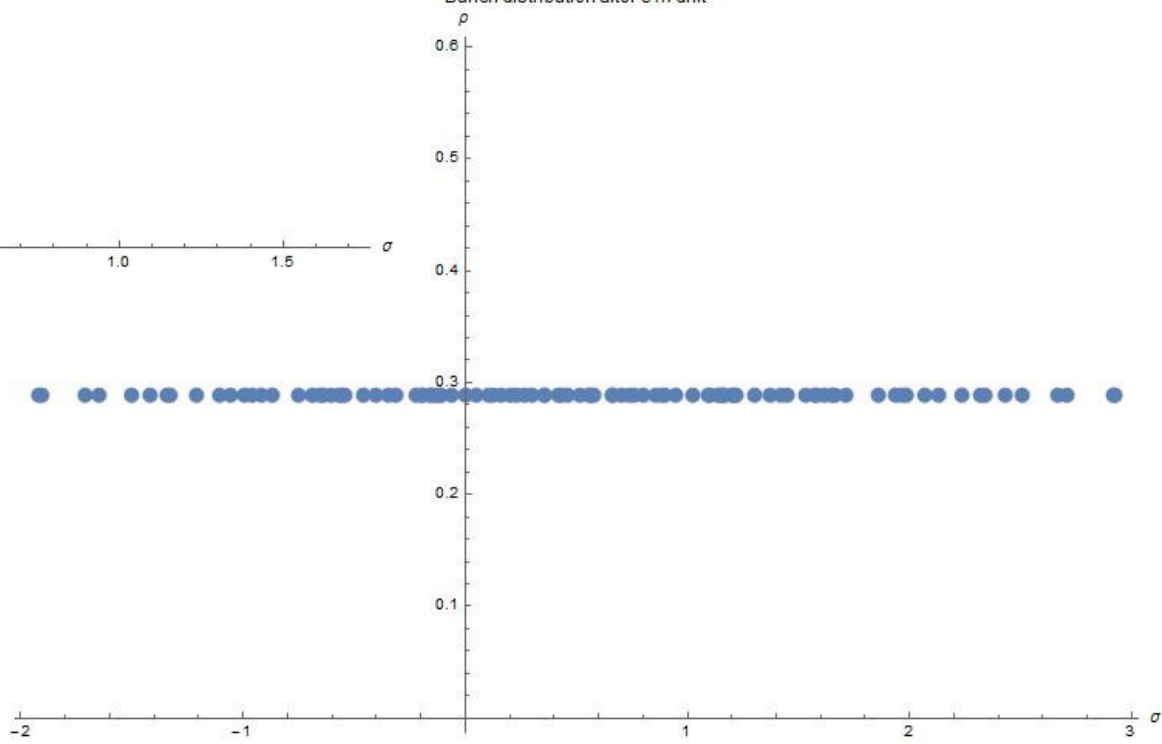


Uniform bunch

Bunch distribution after 5 cm drift



Bunch distribution after 5 m drift



Next step

- **Bunch shape change in the waveguide**

Thank you