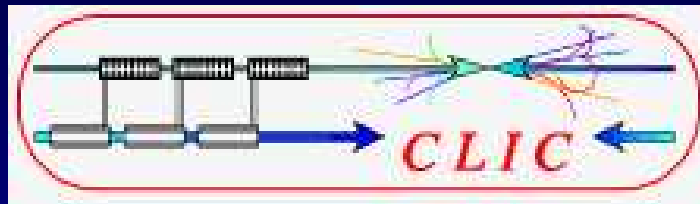


Using CTF3 Califes probe beam as a test bench for wakefields



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CLIC collimation meeting, January 2009

Motivation

- Collimator wakefields may limit CLIC performance
- CLIC parameters sit close to limit of formulae applicability
- Previous experiments show discrepancies with model
- Non-linear components?

Resistive wakefield

- Long bunch regime:

$$0.63(2g^2/(Z_0\sigma))^{1/3} \ll \sigma_z \ll 2g^2c\sigma\mu_0$$

- Short bunch regime:

$$\sigma_z < 0.63(2g^2/(Z_0\sigma))^{1/3}$$

- For CLIC, $\sigma_z = 44\mu m$:

$$2g^2c\sigma\mu_0 \approx 0.5m$$

$$0.63(2g^2/(Z_0\sigma))^{1/3} \approx 5\mu m$$

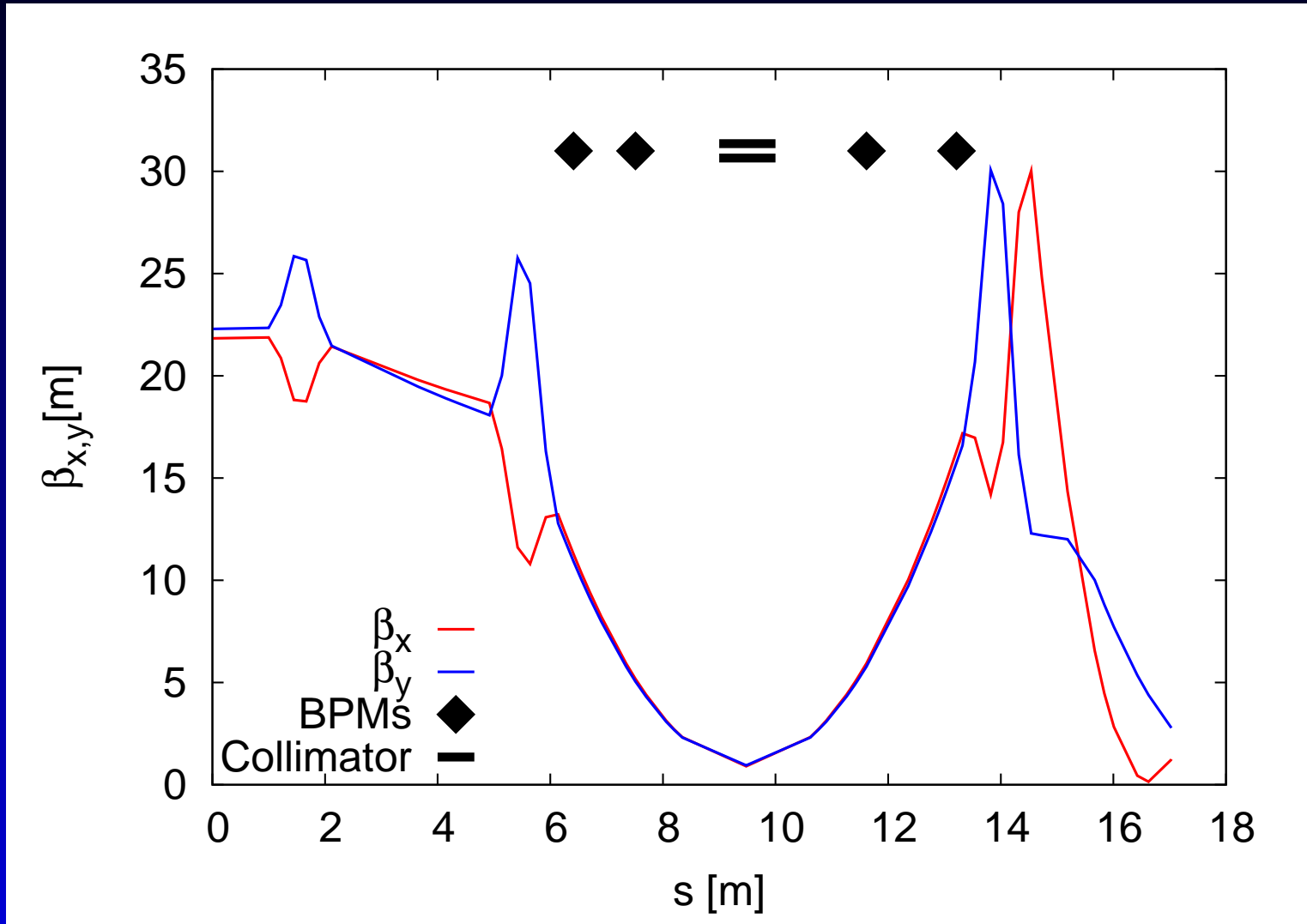
Califes probe beam parameters

Energy	200 MeV
Energy spread	2%
Normalized emittances	$20\mu\text{m}$
Bunch charge	0.6nC
Bunch length	0.75ps

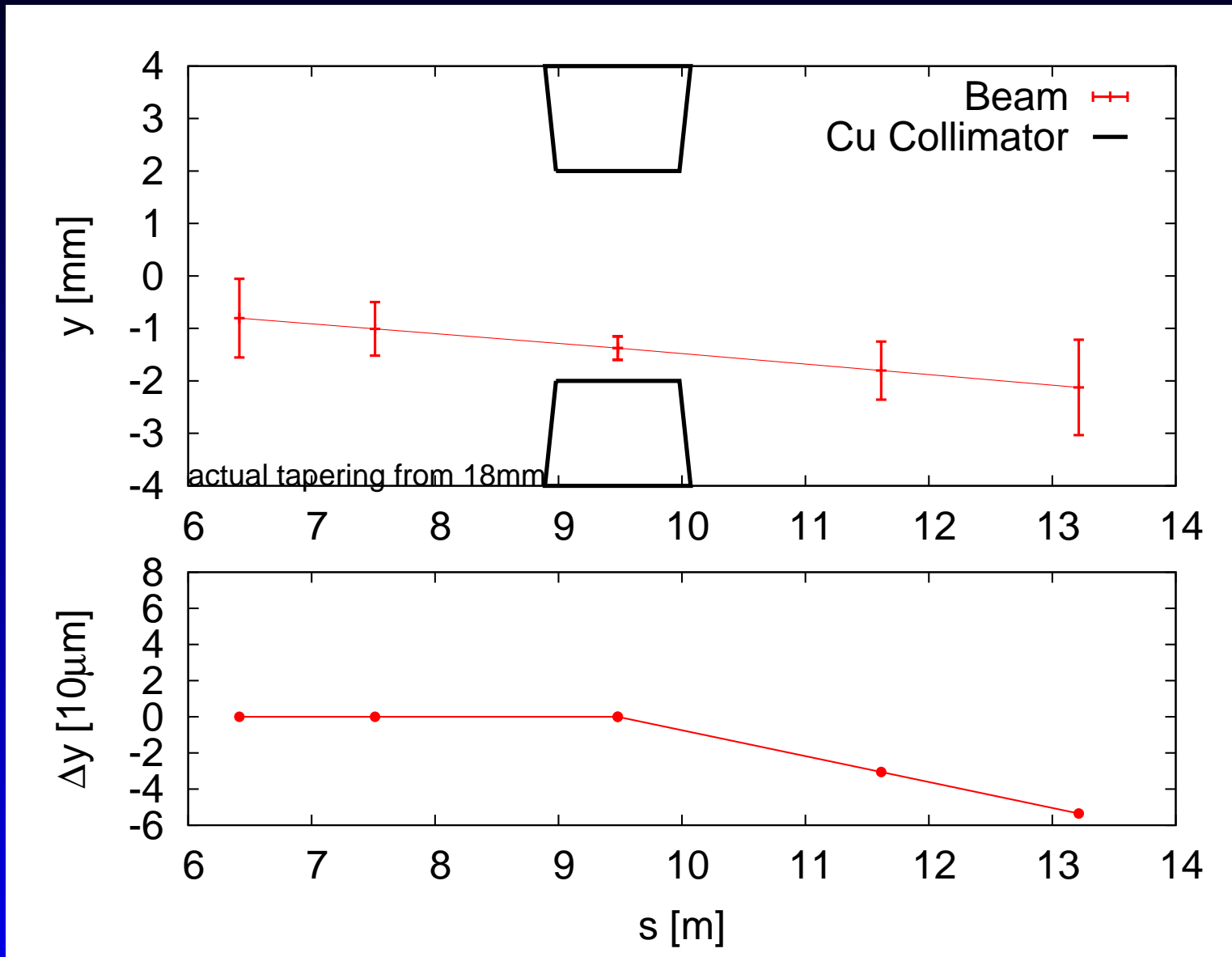
Same bunch charge as CLIC.

Bunch length is 5 times longer than CLIC.

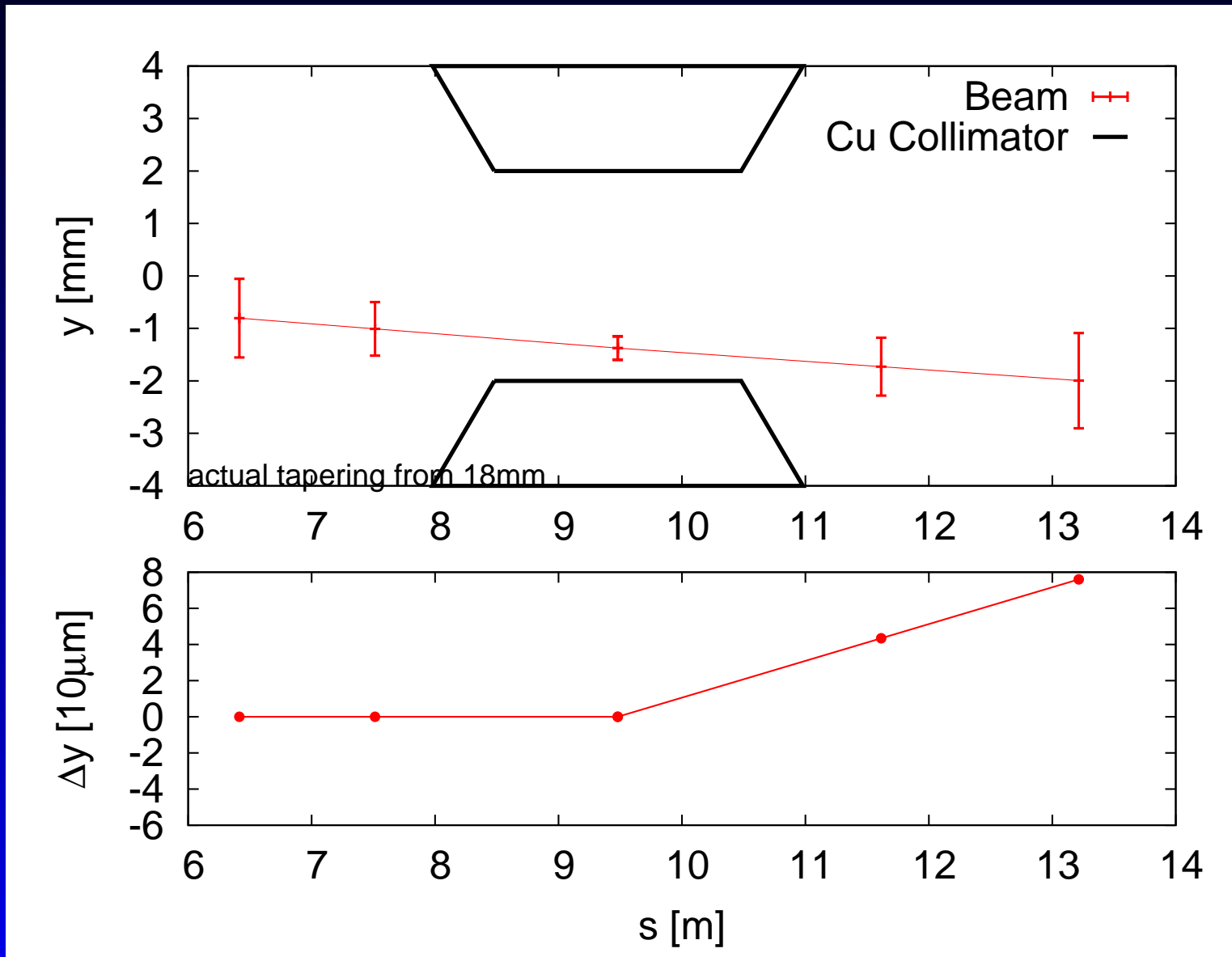
Set-up (optics by V. Ziemmann)



Cu collimator pushed example



Another Cu collimator example



Summary

- Existing set-up with almost 8m free distance
- Order of magnitude of position shift due to wakefield $10 \mu\text{m}$.
- Therefore BPMs requirement in the $1 \mu\text{m}$ level
- Non-linear wakefields?
- Reproducibility?