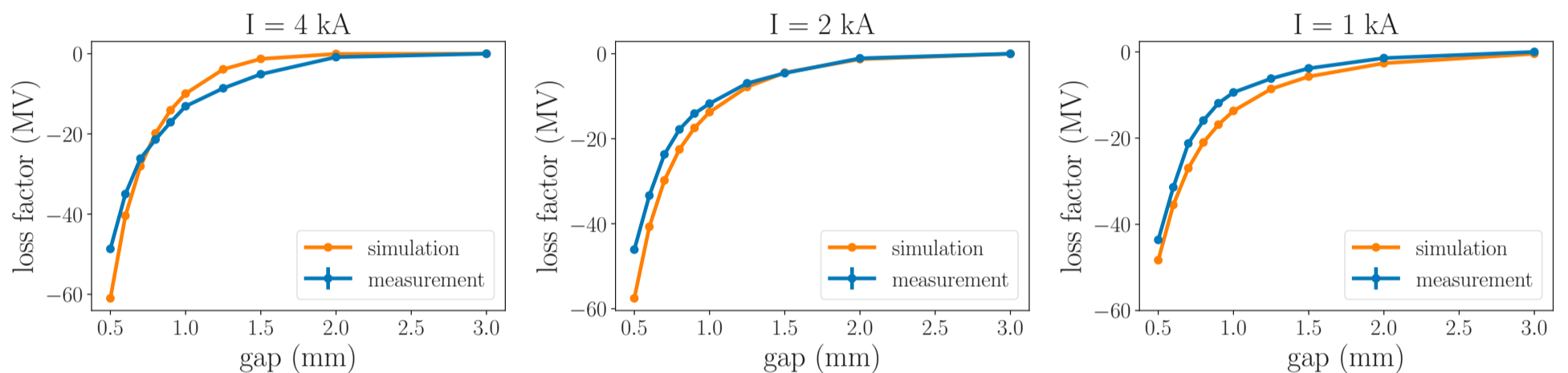


# Using a passive dielectric structure to manipulate FEL beams

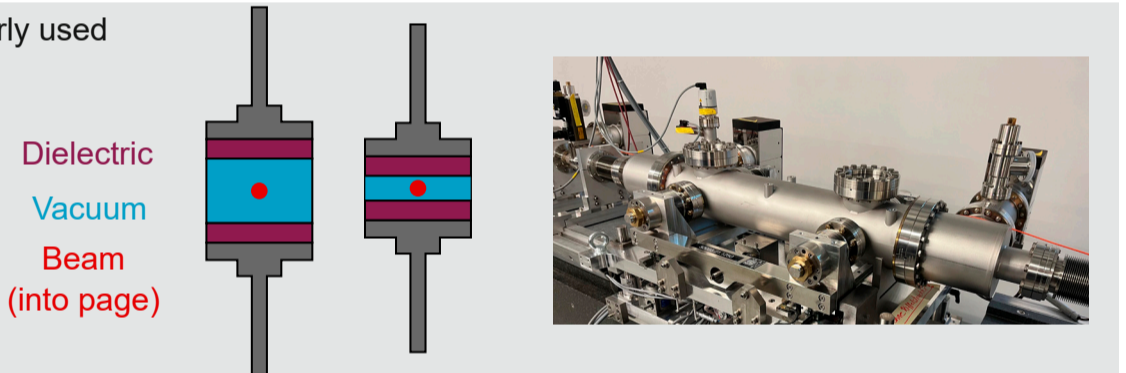
Evan Ericson, Rasmus Ischebeck, Paolo Craievich, Fabio Marcellini, Sven Reiche, Eduard Prat, Mike Seidel

**Results:** Simulations reproduce dechirper loss factors measured during experiments for three bunch currents.



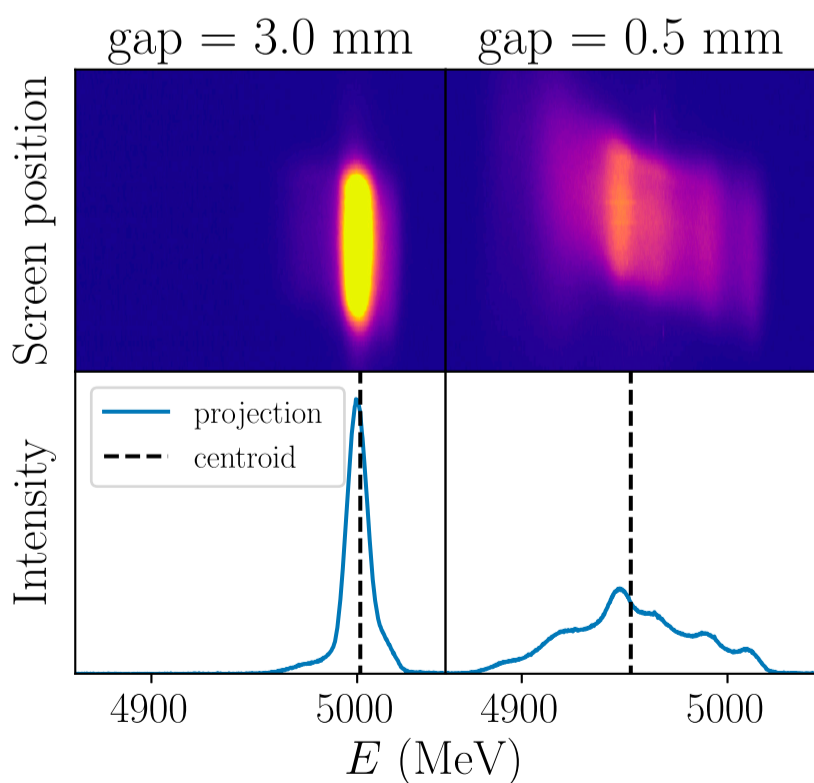
SwissFEL has two flat dielectric dechirpers that are regularly used for beam shaping. Their parameters are:

Half-gap	0.25 mm - 1.5 mm
Length	1 m
Width	15 mm
Dielectric thickness	0.4 mm
Dielectric permittivity	~10



## Measurements

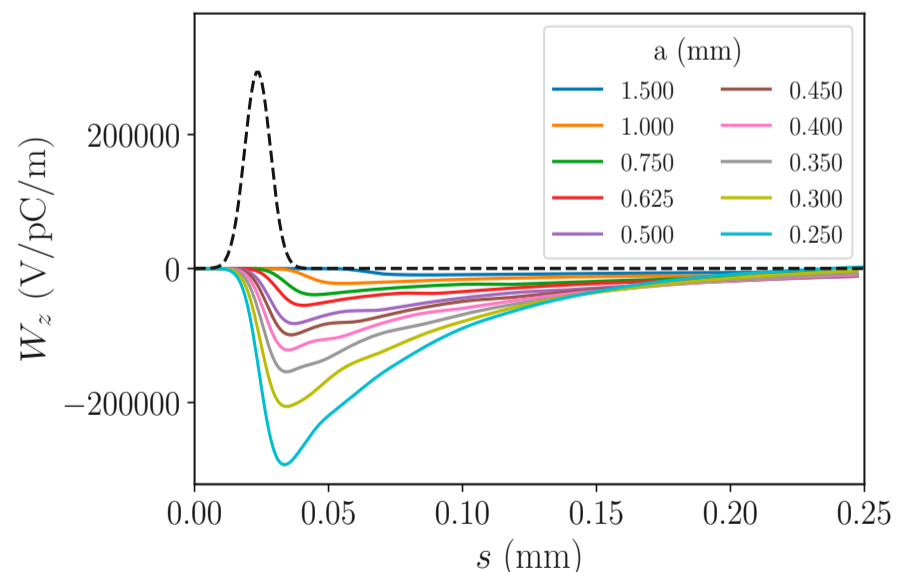
A mono-energetic beam was sent into the dechirpers, the resulting energy spectra were recorded



$$\text{loss factor} = \text{centroid at gap setting} + \text{centroid at open gap}$$

## Simulations

ECHO [1] was used to simulate ~fs long bunches passing through the dechirpers



The loss factor is calculated using

$$\text{loss factor} = \int_{-\infty}^{\infty} W_z(s)\rho(s) ds$$

## Reference

[1] I. Zagorodnov, K. L. F. Bane, and G. Stupakov, Calculation of wakefields in 2D rectangular structures. Phys. Rev. ST Accel. Beams **18**, 104401 (2015).

