

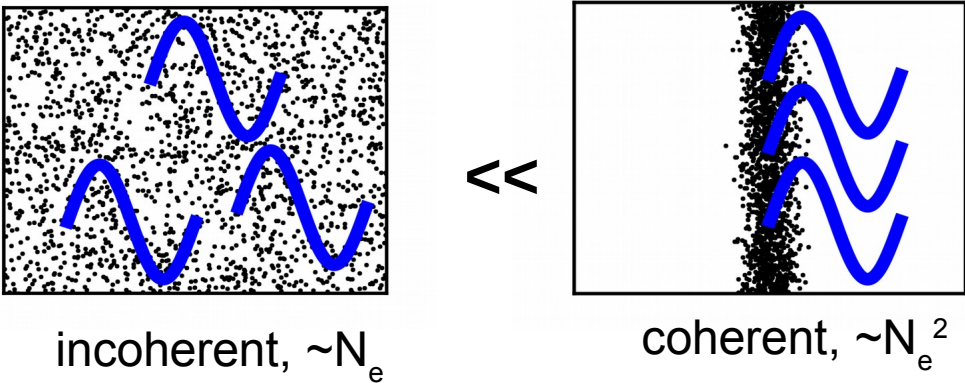
# Bunch Profile Reconstructions Based on THz Spectroscopy at EuXFEL

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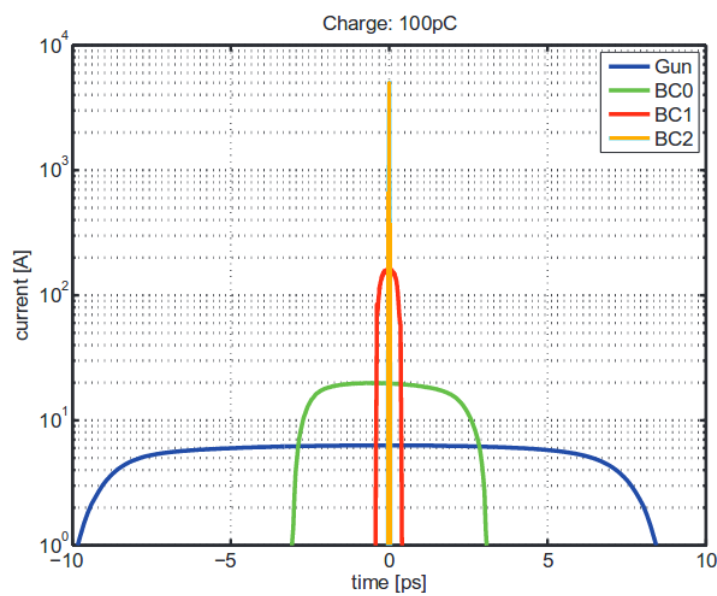
ARD Matter and Technology ST3 Annual Meeting  
GSI Darmstadt, 10.2019

# Longitudinal Diagnostic by Coherent Emission

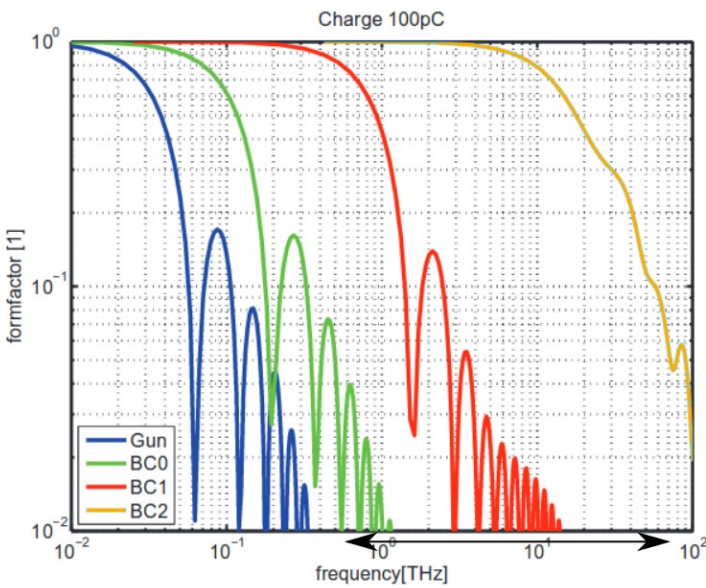
## Coherent Emission of Radiation



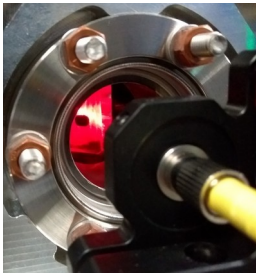
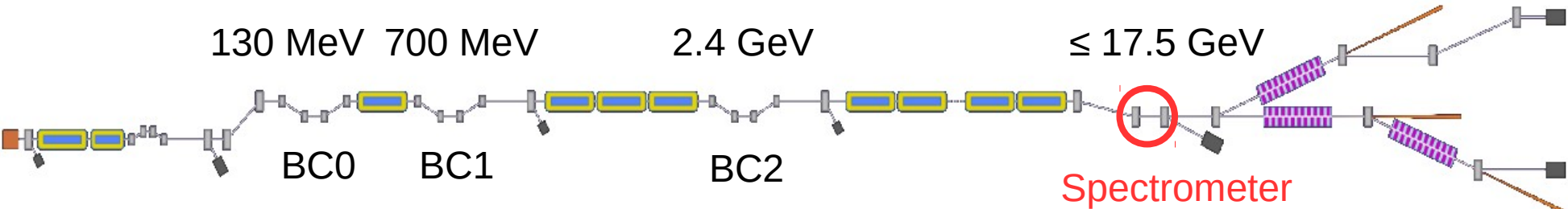
## Longitudinal Form Factor



$$F_l(\omega) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \rho(t) e^{-i\omega t} dt$$

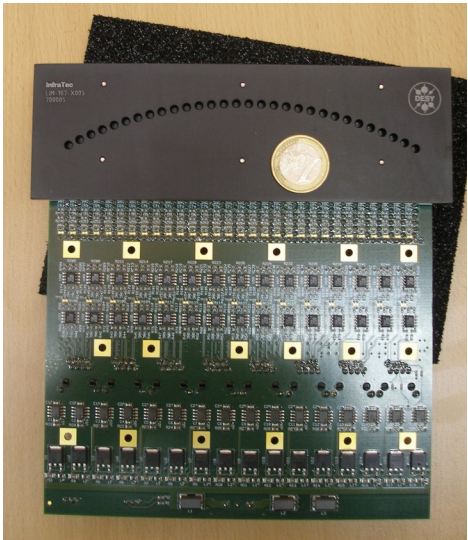
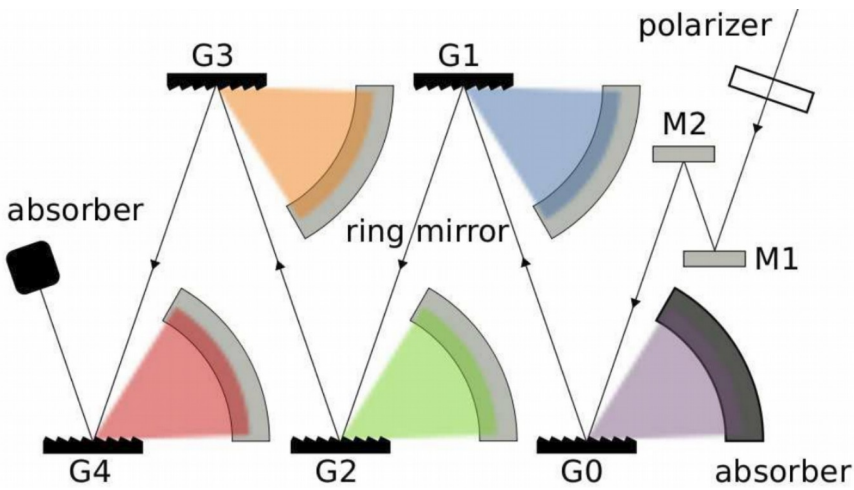


# Setup at European XFEL



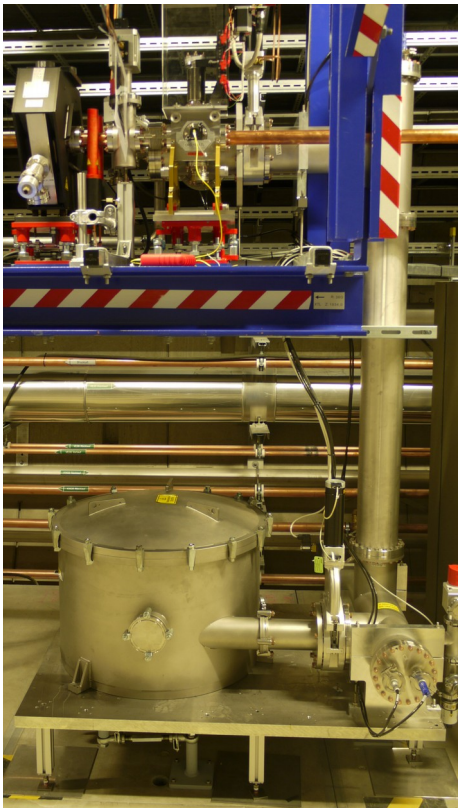
Diffraction Radiation  
→ non-invasive

## Spectrometer

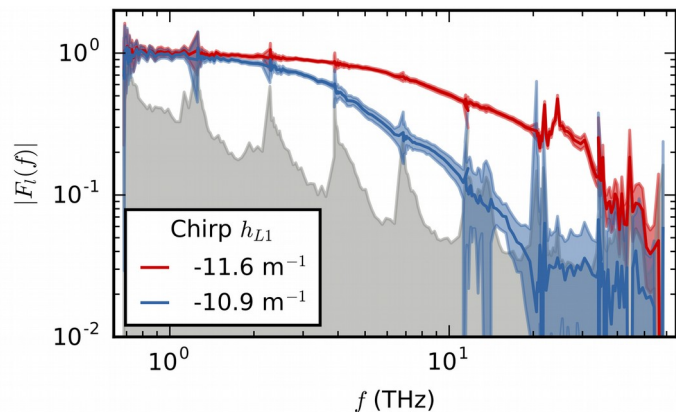


4-staged grating spectrometer  
Two grating sets 0.6-6 and 6-60 THz

4 pyroelectric detector arrays  
with each 30 channels

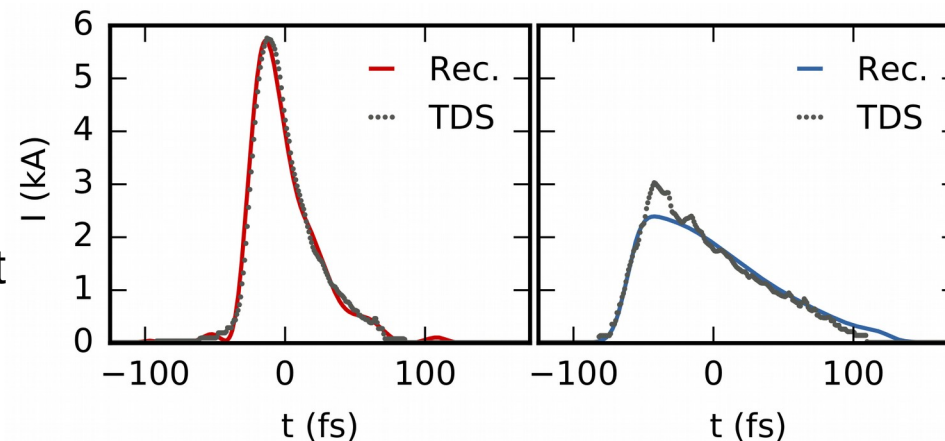


# On the Poster

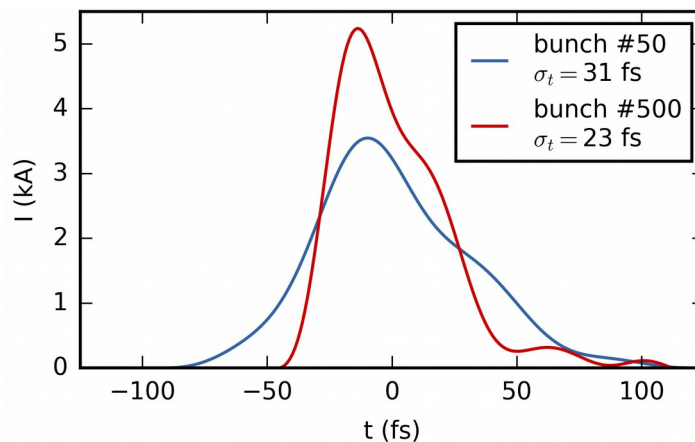
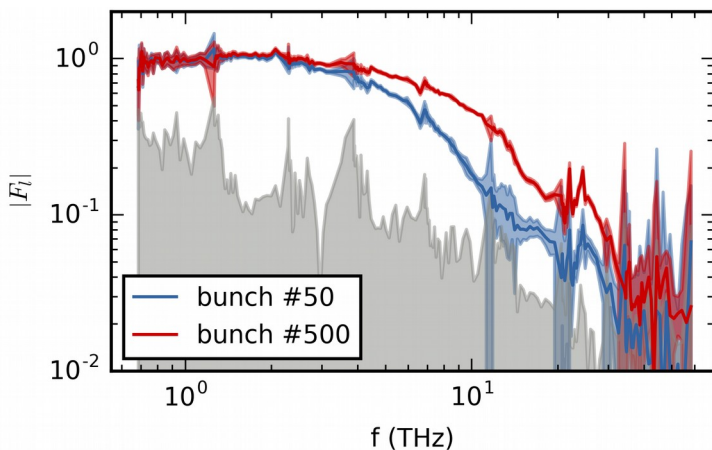


- Measured form factors

- Reconstructed current profiles ↔ TDS



- Measurements along the bunch train



... and much more

- Different RF settings along bunch train for optimum SASE in respective FEL beamlines