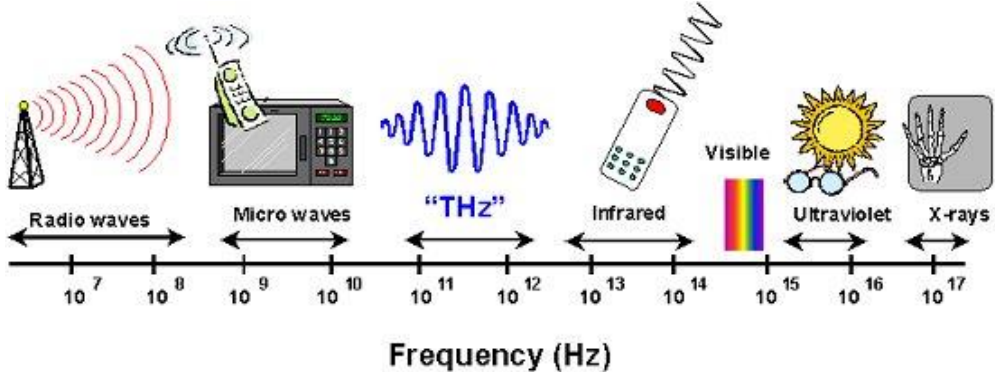
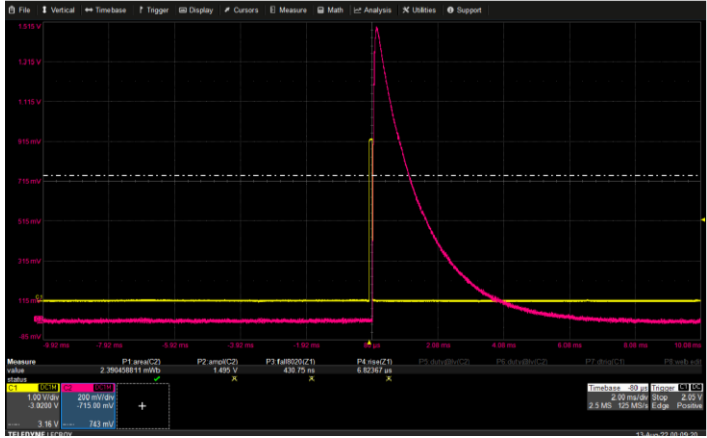


THz@PITZ: First Commissioning Results (1st THz SASE FEL)

Prach Boonpornprasert for the THz @ PITZ Team



In 2012...

THz SASE source for pump-probe experiments @Eu-XFEL

PITZ-like accelerator can enable high power, tunable, synchronized IR/THz radiation

Proceedings of FEL2012, Nara, Japan

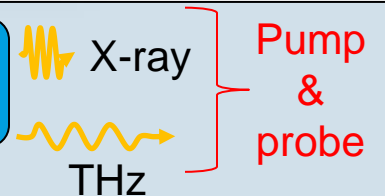
WEPD55

TUNABLE IR/THz SOURCE FOR PUMP PROBE EXPERIMENTS AT THE EUROPEAN XFEL

E.A. Schneidmiller, M.V. Yurkov, DESY, Hamburg, Germany
M. Krasilnikov, F. Stephan, DESY, Zeuthen, Germany

European XFEL (~3.4 km)

PITZ-like accelerator based THz source (~20 m)



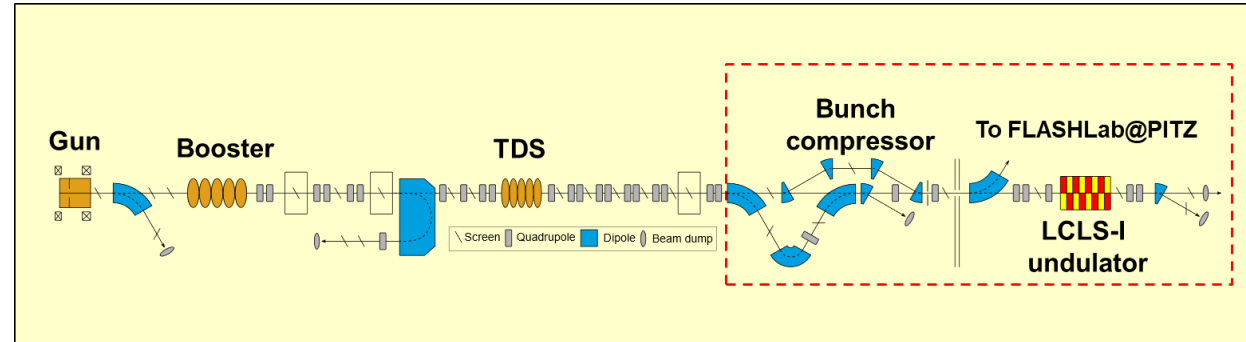
*E.A. Schneidmiller, M.V. Yurkov, (DESY, Hamburg), M. Krasilnikov, F. Stephan, (DESY, Zeuthen),
"Tunable IR/THz source for pump probe experiments at the European XFEL, Contribution to FEL 2012, Nara, Japan, August 2012"*

- Accelerator based THz source **meets requirements** for pump-probe experiments (e.g. **the same pulse train structure!**)
- Construction of **radiation shielded area** for installing reduced copy of PITZ is possible close to user experiments at E-XFEL
- **Prototype** of accelerator already exists → **PITZ** facility at DESY in Zeuthen

In 2022...

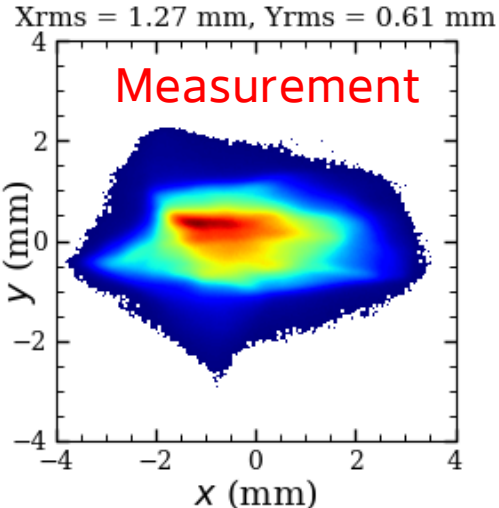
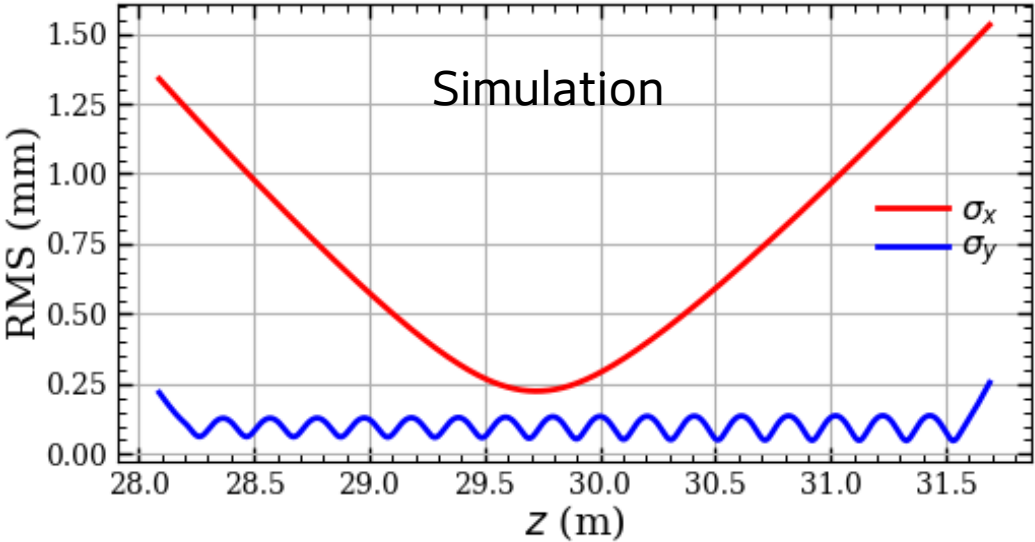
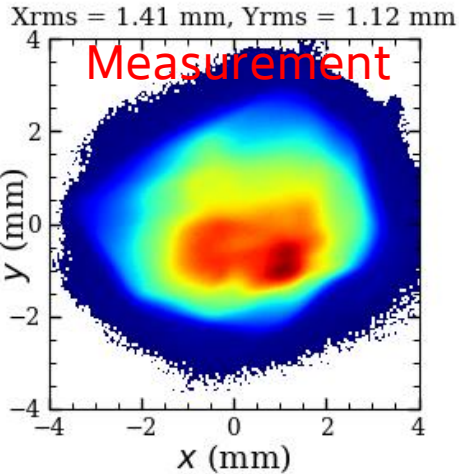
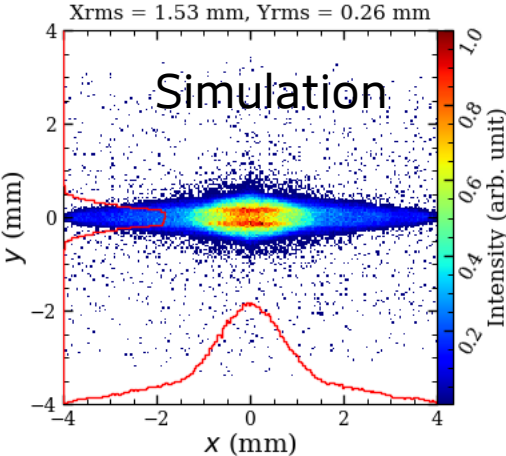
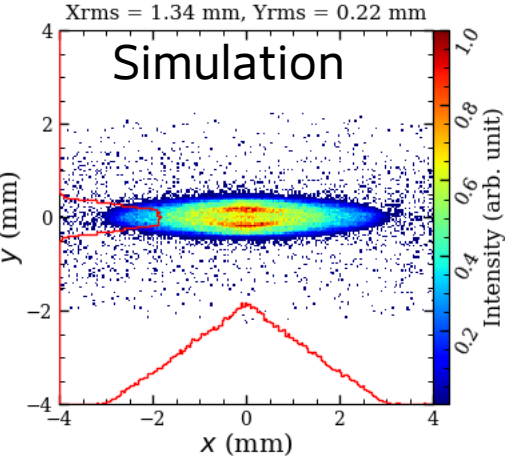
PITZ Beamline Modification and Extension

The extended PITZ beamline was ready for 1st commissioning in July 2022



The beamline in the tunnel annex

Beam Transport and Matching



First Characterization of THz SASE FEL at PITZ

FEL Gain Curves

$$\rho(W) \propto \frac{M^M}{\Gamma(M)} \left(\frac{W}{\langle W \rangle}\right)^{M-1} \frac{1}{\langle W \rangle} \exp\left[-M \frac{W}{\langle W \rangle}\right], \text{ where } M = \frac{\langle W \rangle^2}{\sigma_W^2}$$

Operation / THz generation:

- **First lasing at ~100μm → high gain THz SASE FEL at PITZ!**
- Gain curves at 1, 2 and 3nC
- Currently >10μJ (further optimization ongoing)

