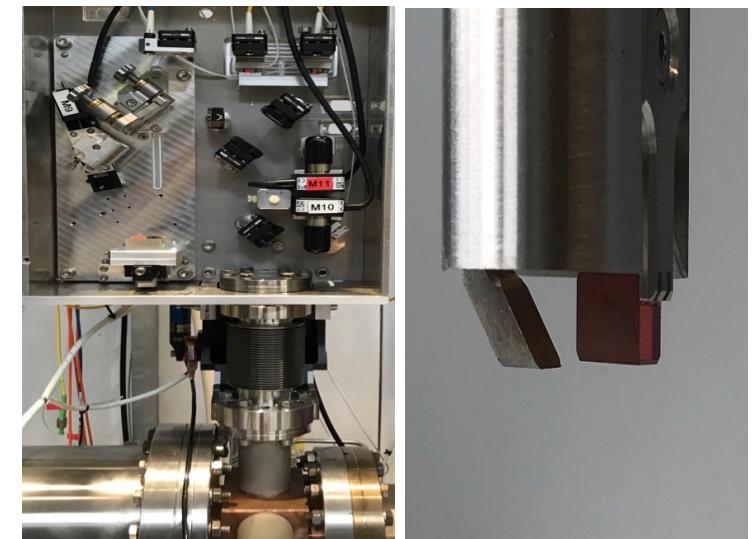
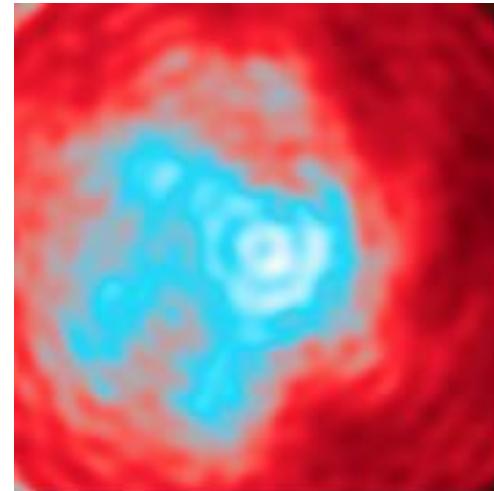
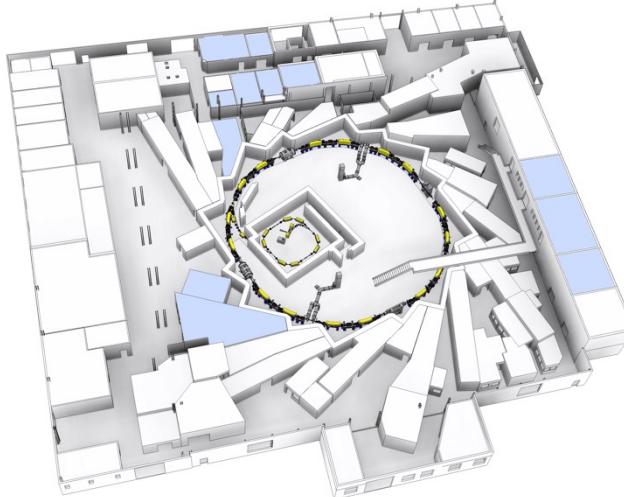


# Electro-Optical Diagnostics at KARA

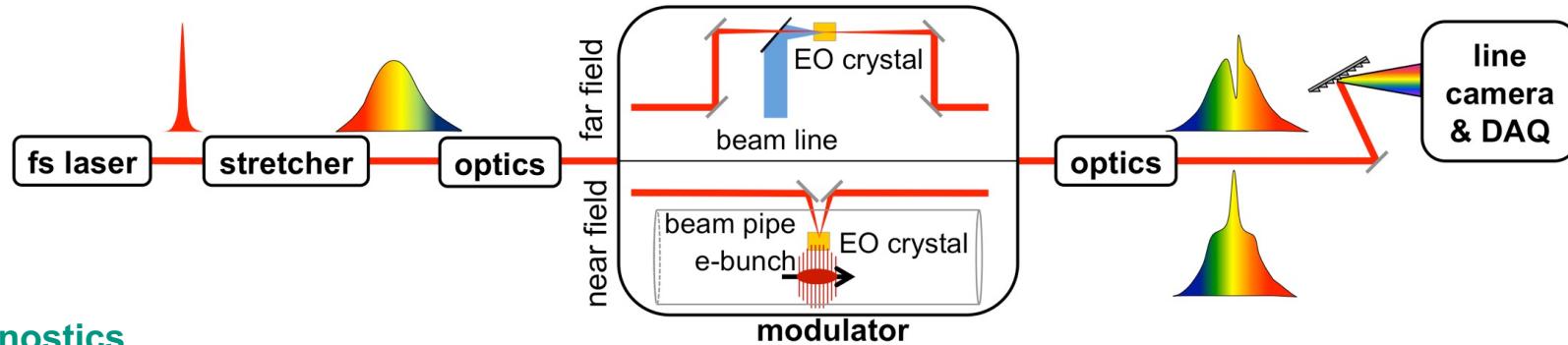
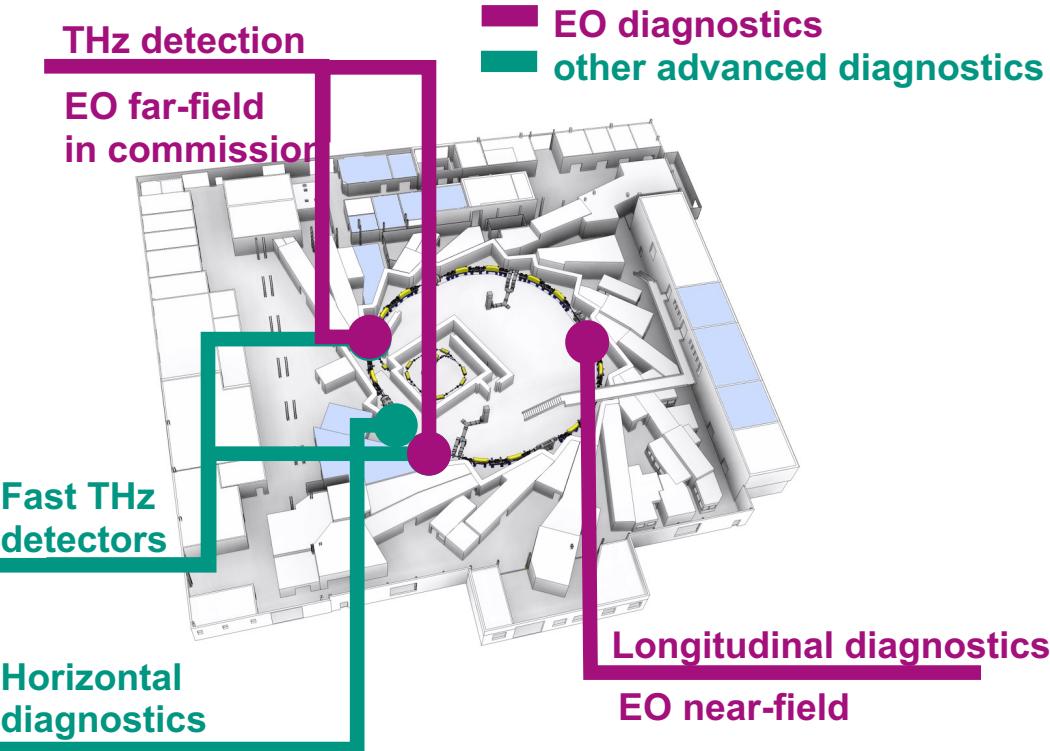
10th MT ARD ST3 Meeting 2022 in Berlin

G. Niehues, E. Bründermann, S. Funkner, M. M. Patil, M. Reißig, J. L. Steinmann, C. Widmann, and A.-S. Müller



# Distributed Sensor Network @ KARA with EO Far- and Near-Field Diagnostics

Synchronized single-shot beam diagnostics:



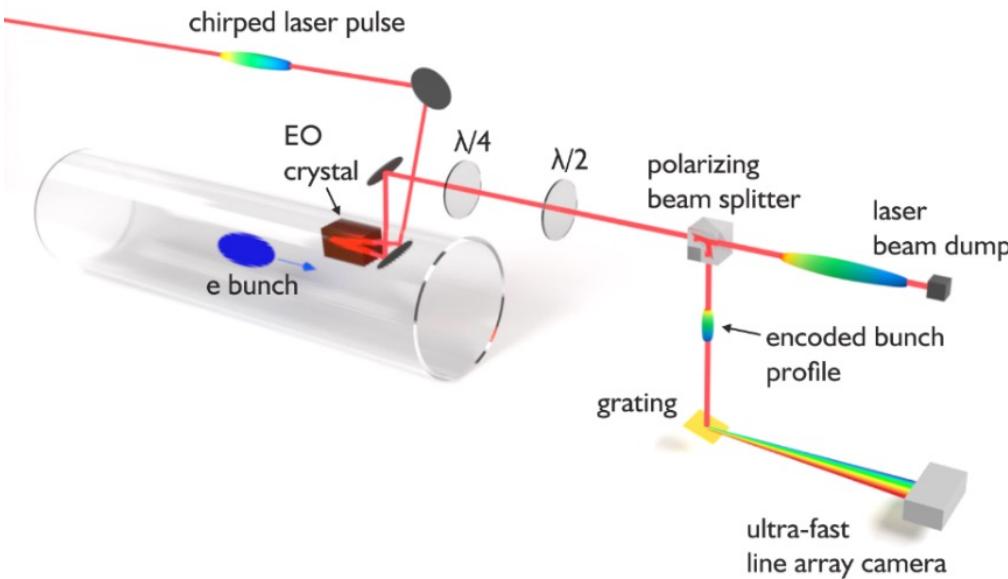
- **Far-Field:** Measurements at a beamline of the CSR pulse shape
- **Near-Field:** Measurements inside the beam pipe of the longitudinal bunch profile

- [1] M. Brosi et al., Phys. Rev. Accel. Beams 19, 110701 (2016).
- [2] B. Kehrer et al., PRAB 21(19), 102803 (2018).
- [3] J. L. Steinmann et al., PRAB 21(11), 110705 (2018).
- [4] S. Funkner et al., PRAB 22(2), 022801 (2019).
- [5] M. Brosi et al., Proc. IPAC, WEPTS015 (2019).
- [6] G. Niehues et al., SPIE LASE, Proc. Vol. 10903 (2019);
- [7] S. Funkner et al. arXiv preprint, arXiv:1912.01323.
- [8] C. Widmann et al. MOPAB294, IPAC 2021.
- [9] M. Patil et al., FRXC03, IPAC 2021.
- [9] G. Niehues et al. MOPAB293, IPAC 2021;
- [10] C. Widmann et al., MOPOPT024, IPAC 2022.
- [11] M. Reißig et al., MOPOPT025, IPAC 2022

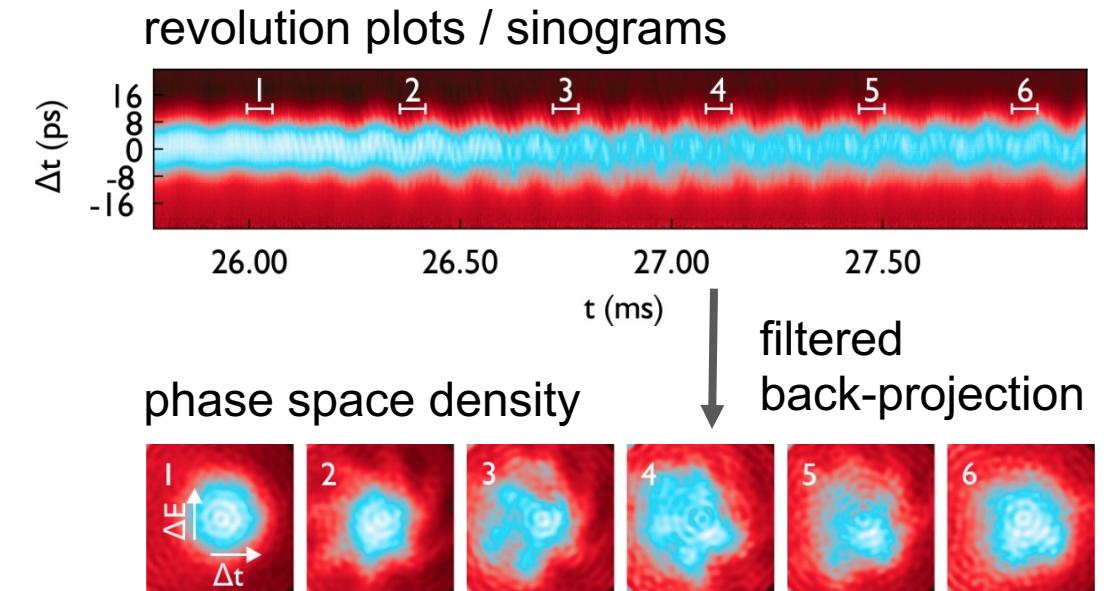
- Starting 10/2022: BMBF funded project for 3 years EVEBUD in cooperation with University Dortmund/DELTA

# Near-Field EO @ KARA: Phase Space Tomography

EOSD experiment



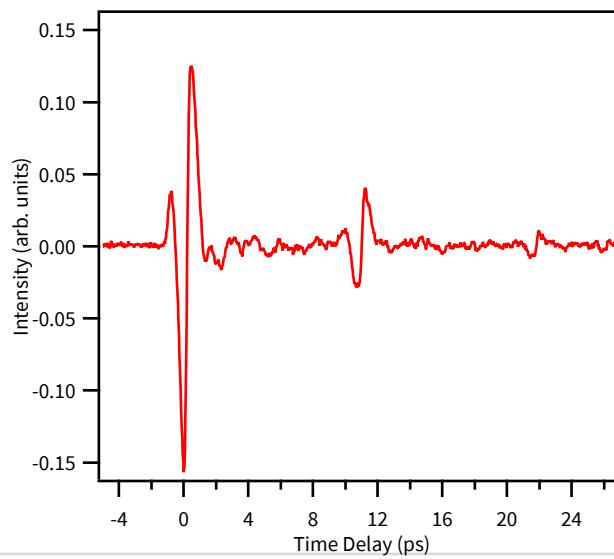
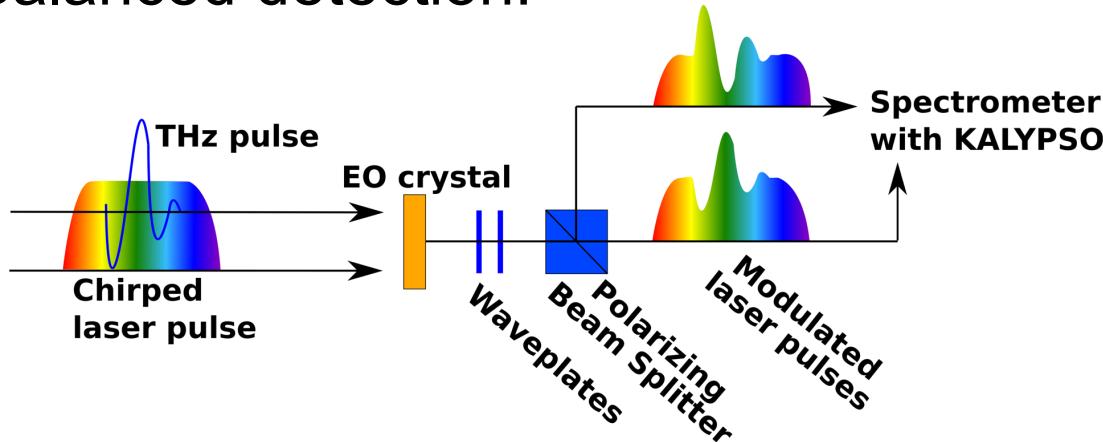
S. Funkner, et al., arXiv preprint, arXiv:1912.01323.



- complete phase space image reconstructed from time interval of 61  $\mu$ s
- „Randon morphing“ between independent measurement

# Far-Field EO @ KARA: Far-Field Demonstrator for Off-line Tests

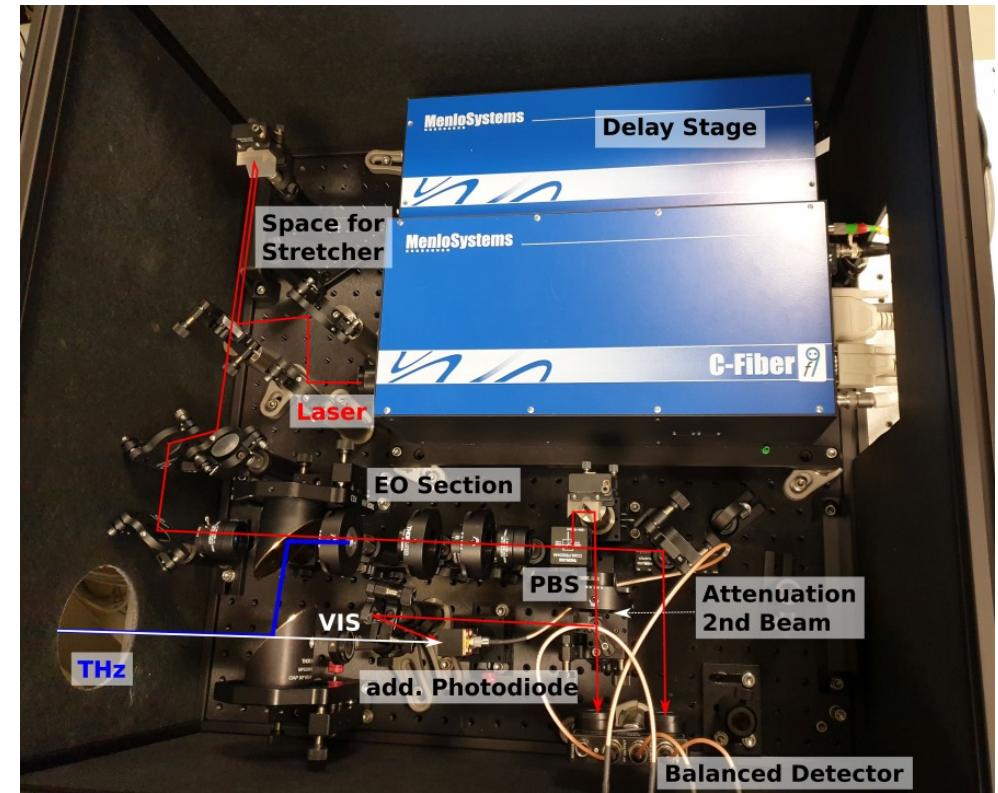
Balanced detection:



- balanced detection demonstrates clear EOS signal
- Next steps:
  - EOSD measurements for single-shot detection
  - Transfer to beam line

C. Widmann et al. MOPAB294, IPAC 2021.  
C. Widmann et al. MOPOPT024, IPAC 2022.

EOS far-field demonstrator setup:



blue: THz beam path; red: laser beam path