

# PhotonMEADOW 2023

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## Single shot tender X-ray spectral measurements via the 3rd harmonic using bent crystals

The tender X-ray region provides access to various absorption edges, such as sulfur, chlorine, and silicon, which are of particular interest for developing organic semiconductors. Direct measurement of the X-ray spectrum in the energy region between 2.5 –4.0 keV is challenging and typically suffers from poorer energy resolution from ruled gratings or lower efficiency from scattering-based approaches. Presented here is the modification of a beamline spectrometer at SwissFEL[1], using bent silicon crystals, to measure the single shot spectrum of the 3rd harmonic FEL emission produced in operation at 2.5 keV.

Using a 2D CMOS detector, the transverse mode structure of the 3rd harmonic emission is discussed. The measured spectral bandwidth with the 3rd harmonic is compared to the bandwidth of the fundamental of 2.5 keV when measured via monochromator scanning.

[1] J. Rehanek et al 2017 JINST 12 P05024

### Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

yes

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