

Nonlinear X-ray (Quantum) Optics on an XFEL/XFEL-MOPA

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Science opportunities

- Electronic dynamics (eV-scale) using coherent spectroscopies
- Vibrational dynamics
- Combined electronic and structural information via SRS, PDC, S/DFG, 2PC, etc. general two-photon correlations and 2PA.
- Nuclear nonlinear spectroscopy and QO (different selection rules, search for transitions, internuclear state coupling, reactions, inversion, echo...)
- Nonclassical (entangled, squeezed etc.) x-ray quantum optics and spectroscopy. Ghost imaging, low power NLO (4wm, 2PA).
- Not mentioned but within the realm of possibility NL-QED
- Shows up elsewhere: FT(I)XS.

Special Request

- MOPA (wide band, CPA, etc.)
- Tunable two-color (dual/nested cavity)
- Pulse shaping, interferometric delays, etc.
- Intracavity (focus) for dilute samples, cavity dump or real power amplifier for solid/liquid
- Combs or at least long phase-coherence times (ms or better).
- Extreme focusing.