Towards Quantum Imaging with X-rays at LCLS

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Entangled photon pairs (biphotons) offer a quantum advantage for imaging weakly absorbing samples, but extending this capability to X-ray energies has long been hindered by the extremely small cross-section of X-ray parametric down conversion. Using a parasitic operating mode at the LCLS X-ray Free Electron Laser, we demonstrate the generation of over 11,000 X-ray biphotons per hour through spontaneous parametric down conversion (SPDC) in a CVD diamond crystal, representing a significant step toward practical X-ray quantum imaging.