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8.14 Solid-state framing camera operating in interferometric mode

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A high speed solid-state framing camera has been developed which can operate over a wide range of photon energies. This camera measures the change in the index of refraction of a semiconductor when photons with energies higher than the bandgap are incident upon it. This instrument uses an binary grating in front of the semiconductor to impose a corresponding grating in the semiconductor when photons higher than the band gap pass through the grating and are absorbed in the semiconductor, thereby producing a spatially dependent change in the index of refraction. A probe beam is then scattered off of this grating to measure the x-ray signal incident on the semiconductor. In this particular instrument the zero order scattered probe beam is attenuated and interfered with the higher orders to produce an interferometric image of the phase grating produced inside the semiconductor. This camera has been tested at 3.1 eV and 4.5 keV.

Primary author(s) : BAKER, Kevin (LLNL)

Co-author(s) : STEELE, Paul (LLNL); STEWART, Rick (LLNL); VERNON, Steve (LLNL); HSING, Warren (LLNL); REMINGTON, Bruce (LLNL)

Presenter(s) : BAKER, Kevin (LLNL); STEELE, Paul (LLNL); STEWART, Rick (LLNL); VERNON, Steve (LLNL); HSING, Warren (LLNL); REMINGTON, Bruce (LLNL)

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