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Nanosecond x-ray imaging at LCLS with UXI detectors

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We report on the characterization, application, and future of the four-frame Icarus detector at LCLS. The free electron laser is able to produce intense single femtosecond pulses over a wide range of x-ray energies at 120 Hz (soon to be 10s of kHz) but can also make short trains of pulses down to 350 ps separation. This mode gives us access to a variety of interesting science on these timescales and also allows pumped experiments that are rate limited by the optical laser or that have unique targets to collect multiple frames per shot. The Icarus detector from the UXI collaboration has been characterized at LCLS and used in two experiments. After describing this work we discuss current developments in the UXI program to achieve >4 frames, 350 ps spacing, and higher QE using GaAs sensors. We conclude with prospects for related detectors on the MEC-U timescale.

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