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The X-ray Pump-Probe Instrument at LCLS

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The Linac Coherent Light Source (LCLS) will provide transversely-coherent hard X-rays with unprecedented flux and time resolution. These attributes of the LCLS have the potential to revolutionize the experimental investigation of structural dynamics with X-ray techniques by directly following the time evolution of the electron density during the course of a photo-induced biological, chemical, or physical transformation. The X-ray Pump-Probe instrument (XPP) is designed specifically for this purpose. XPP will be the first hard X-ray experimental station to operate at the LCLS in the fall of 2010. The design and status of XPP will be presented. Femtosecond-level synchronization techniques between the optical laser and the LCLS X-ray pulse, which will allow sub-picosecond time resolution, will be discussed.