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**Synchronization of femtosecond laser and electron pulses with sub-ps precision** RICK CLINITE, HYUK PARK, XUAN WANG, SHOUHUA NIE, JIM CAO, Florida State University — Sub-picosecond synchronization between the pump laser and probe electron pulses is crucial for conducting time-resolved electron diffraction. We have achieved this synchronization with such precision using real-time ultrafast shadow imaging. In this approach we quantitatively monitored the temporal evolution of electron shadow images induced by the transient space-charge field formed near a metal surface in the wake of excitation laser pulses. In principle, this is a universal approach independent of the structural dynamics under investigation and can be applied to a variety of diffraction setups and using laser pulses with different wavelengths.

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