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Accurate Retrieval of Satellite Pulses of Single Isolated Attosecond Pulses MICHAEL CHINI, HE WANG, SABIH KHAN, CHAO WANG, ZENGHU CHANG, Kansas State University — Single isolated pulses less than 300 attoseconds have been generated by amplitude gating, polarization gating and double optical gating. However, pre- and post-pulses always accompany the main pulse, separated by a half or full cycle of the driving laser field. Accurate characterization of the contrast of isolated attosecond pulses is crucial for improving the pulse quality and for experimental applications of such unique sources. Typically, isolated attosecond pulses are measured using the streaking method, and the resulting spectrogram can be analyzed using Frequency-Resolved Optical Gating techniques to retrieve the pulse shape and phase, a technique known as CRAB (Complete Reconstruction of Attosecond Bursts). However, at least two factors can lead to error in the reconstruction of the satellite pulses. Due to the low photoelectron count rate, the CRAB trace is susceptible to shot noise. Also, distortions of the trace occur due to limited energy resolution of the electron detector. These two factors can mask the presence of interference fringes in the spectrogram and lead to underestimation of satellite pulses. We discuss the effects of these two factors on the retrieval of attosecond pulses for several pulse shapes and phases, and we suggest lower limits to the number of photoelectron counts and the energy resolution necessary for accurate reconstruction of the satellite pulses.

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