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Improving count rate of attosecond streak camera XIMAO FENG, STEVE GILBERTSON, HIROKI MASHIKO, HE WANG, SABIH KHAN, MICHAEL CHINI, ZENGHU CHANG — We report the measurement of 140-attosecond single isolated extreme ultraviolet pulses generated with 9-fs carrier-envelope phase stabilized lasers. The temporal shape and phase of the isolated attosecond pulses were characterized using the attosecond streaking technique, whereby electrons ionized by the attosecond pulse are momentum-shifted by a near-infrared laser field. Due to the limited flux of attosecond pulses, low electron count rate is a major problem in the streaking measurement. In our setup, the streaked photoelectrons were detected by a COLTRIMS (Cold Target Recoil Ion Momentum Spectroscopy) type time-of-flight detector. A uniform magnetic field was applied along the flight axis between the detection gas jet and the MCP to increase the full acceptance angle to more than 28 degrees. Instead of measuring the photoelectron energy, the electron momentum was measured, which allows us to examine the effect of the acceptance angle on the accuracy of the pulse characterization. Differential pumping was successfully applied, which allows high gas target pressure for increasing the XUV photoionization efficiency. When the isolated attosecond pulses were generated with argon gas and detected with neon gas, the improved count rate allowed the streaking measurement to be done in the time period that the laser could maintain carrier-envelope phase locking.

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