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Using Ion-imaging to Measure Gouy Phase Shift and Wave-front Distortions for Attosecond Pump-Probe Experiments NIRANJAN SHIVARAM, Department of Physics, University of Arizona, LEI XU, ADAM ROBERTS, ARVINDER SANDHU — In typical attosecond experiments using extreme-ultraviolet (XUV) pulses produced by high harmonic generation, an infrared (IR)/visible laser pulse is used as a time delayed pump or probe. Such experiments are very sensitive to the phase between XUV and IR fields and it is of crucial importance that the phase difference remain constant over the entire region of observation. However, in practice, Gouy phase shift and wave-front distortions are inherently present in most experimental geometries which lead to phase ambiguities and it is thus important to measure them accurately. We present here a method for direct measurement of Gouy phase shift and wave-front distortions in the focus using two-pulse ionization of Xe. These quantities are measured for a TEM_{00} mode reflected from a mirror with a hole using 2-D imaging of Xe ions produced in the focal region by a superposition of two IR pulses and for IR+XUV superposition. The resolution in this measurement is in principle limited only by the pixel size of the detector.

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