

Abstract Submitted
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Ab initio theory for extracting the carrier-envelope phase from stereo ATI measurements¹ DUSTIN URSREY, BRETT ESRY, J.R. Macdonald
Laboratory, Kansas State University, Manhattan, Kansas 66506, USA — Using stereo above threshold ionization measurements of xenon to extract the carrier-envelope phase (CEP) of a single laser pulse via parametric amplitude plots (PAPs) has had great success [1], but the associated analysis is largely based on empirical observations. Here, we present a general, exact, ab initio theory that gives analytic expressions for the spatial asymmetry and thus the PAP. Our formulation shows that the experimental observation that the asymmetry varies approximately sinusoidally in the CEP is a lowest-order approximation valid mainly at low intensities. With our exact result, we will examine the impact of the higher-order contributions, especially their effect on the extraction of the CEP. In addition, our analytic result potentially enables the absolute CEP to be extracted without the need for carefully chosen energy ranges or solving the TDSE as are currently required. We will also discuss how our results can be used to identify experimental issues in the PAPs and generally how they can improve the CEP extraction process. [1] T Rathje et al 2012 J. Phys. B: At. Mol. Opt. Phys.45 074003

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