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Defining photon channels in strong-field physics: the photon-phase Fourier representation[1] SHUO ZENG, MOHAMMAD ZOHRABI, BEN BERRY, UTUQ ABLIKIM, NORA KLING, TRAVIS SEVERT, BETHANY JOCHIM, KEVIN CARNES, ITZIK BEN-ITZHAK, BRETT ESRY, J. R. Macdonald Laboratory, Department of Physics, Kansas State University — In strong-field physics, complex atomic and molecular dynamics can be steered by the carrier-envelope phase (CEP). The general theory formulated in Refs. [1,2], provides a rigorous foundation upon which this understanding might be built. By recognizing the underlying periodicity of the time-dependent Schrödinger equation—and thus its solutions—in the CEP, *all* CEP effects can be understood as the interference of different photon channels [1,2]. We will show that this understanding can be turned around to extract information on the photon channel by examining the CEP dependence. In particular, by taking the Fourier transform with respect to the CEP, photon channel information can be extracted from both theory and experiment. Through several examples, we will also show that this technique can be applied to any system and provides knowledge of the net numbers of photons absorbed—even in few-cycle pulses—that is not available in any other way. [1] V. Roudnev and B. D. Esry, Phys. Rev. Lett. **99**, 220406 (2007) [2] J. J. Hua and B. D. Esry, J. Phys. B **42**, 085601 (2009)

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Shuo Zeng
J. R. Macdonald Laboratory, Department of Physics, Kansas State University

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