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Investigating the influence of overdense plasma surfaces in high harmonic generation from high-intensity laser irradiation ANTHONY RAYMOND, CALVIN ZULICK, PAUL CUMMINGS, Center for Ultrafast Optical Science, University of Michigan, Ann Arbor, Michigan 48109-2099, USA, FRANKLIN DOLLAR, JILA, University of Colorado, Boulder, CO 80309, USA, VLADIMIR CHVYKOV, LOUISE WILLINGALE, VICTOR YANOVSKY, ANATOLY MAKSIMCHUK, ALEXANDER THOMAS, KARL KRUSHELNICK, Center for Ultrafast Optical Science, University of Michigan, Ann Arbor, Michigan 48109-2099, USA
— In recent experimental campaigns and computational surveys, high harmonic generation (HHG) has found applications as a diagnostic tool, revealing information regarding pre-plasma scale-length and in extension laser contrast [1], in addition to many applications such as a direct means by which to produce trains of attosecond pulses [2]: via filtering lower-ordered multiples of the fundamental frequency. Additional flexibility and utility may be derived by pre-shaping the target-area of the material undergoing irradiation on the micron scale, as the results of 2D PIC simulations carried out at the University of Michigan's High Field Science group imply. Specifically, micron-scale parabolic and spherically concave target geometries are investigated in regard to their ability to collimate and further refocus the reflected harmonic beam, respectively. Additionally, results are summarized from experimental investigations carried out at the same research facility with ultrafast, ultra-relativistic, and high-contrast pulses regarding the effect of the target's pre-plasma scale-length on the efficacy of the resultant reflected beam's harmonic content. [1] F. Dollar, et al., Phys. Rev. Lett. 110, 175002 (2013) [2] George D Tsakiris, et al., New Journal of Physics 8 (2006) 19

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