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Phase-matching of attosecond XUV supercontinuum STEVE GILBERTSON, HIROKI MASHIKO, CHENGQUAN LI, SABIH KHAN, MAHENDRA SHAKYA, ERIC MOON, ZENGHU CHANG, Kansas State University —
Adding a weak second harmonic field to an ellipticity dependent polarization gating field allowed for the production of XUV supercontinua from longer (∼10 fs) input pulses in argon. The spectra support 200 as single isolated pulses. This technique, dubbed double optical gating (DOG), demonstrated a large enhancement of the harmonic yield as compared with polarization gating. These results can be attributed to the reduced depletion of the ground state of the target from the leading edge of the pulse and the increased intensity inside the polarization gate width. Through optimization of the harmonic generation process under the phase matching conditions, we were able to further increase the harmonic flux. The parameters included the target gas pressure, laser focus position, input pulse duration, and polarization gate width. By varying the CE phase of the pulse, we were able to verify that the results were indeed from DOG due to its unique 2 pi dependence on the harmonic spectrum. We were able to extend our results to neon. Its higher ionization potential allowed an extension of the harmonic cutoff for the production of even shorter pulses.

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