

Abstract Submitted
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Ionization dynamics inside femtosecond enhancement cavities¹

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University of Arizona — Intra-cavity high harmonic generation utilizing femtosecond enhancement cavities (fsEC) has been shown as a route to generate frequency combs in the vacuum-ultraviolet. Such VUV frequency combs have the potential to enable precision spectroscopy in this otherwise difficult to access spectral region. Pulse energies exceeding $25 \mu\text{J}$ are achievable inside a fsEC with peak intensities at the intracavity focus above $1 \times 10^{14} \text{W/cm}^2$. At these intensities, we identify fundamental limitations to the intracavity pulse evolution due to ionization induced phase shifts and spectral blue shifting. Numerical simulations and experimental measurements of the intra-cavity ionization dynamics will be presented. We show that the fsEC can itself be used for precise measurements of extreme optical nonlinearities.

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