

Abstract Submitted  
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**Ionization dynamics inside femtosecond enhancement cavities<sup>1</sup>**  
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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  $1 \times 10^{14} \text{W}/\text{cm}^2$ . 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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