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***Ab Initio* Theoretical Investigation of the Frequency Comb Structure in the XUV Regime via High Harmonic Generation**[1] JUAN J. CARRERA, University of Kansas, SANG-KIL SON, Univerity of Kansas, SHIH-I. CHU, University of Kansas — We present an *ab initio* quantum investigation of the frequency comb structure formed within each high harmonic generation (HHG) power spectrum driven by a train of equal- spacing short laser pulses. The HHG power spectrum of atomic hydrogen is calculated by solving the time-dependent Schrö dinger equation accurately and efficiently by means of the time- dependent generalized pseudospectral method. We found that the frequency comb structure is preserved within each harmonic. In addition, the repetition frequency of the comb laser depends upon the pulse separation τ and the spectral width of each individual comb fringe is inversely proportional to the number of pulses (n) used. However, the global HHG power spectrum pattern depends only upon the laser frequency and intensity used and is not sensitive to the τ and n parameters. Finally, the frequency comb structure persists even in the presence of appreciable ionization.

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