

# Optimising Fields for HHG

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We present recent work that goes beyond simply using single frequency fields at 800nm for HHG and instead try to approach more optimum conditions for HHG in various circumstances.

First we present recent experimental results investigating molecular HHG using 1300nm, where the longer wavelength has permitted us to study the harmonic spectrum over a larger photon energy range than possible at 800nm. Measurements on the spectrum and alignment dependence in CO<sub>2</sub>, N<sub>2</sub>, N<sub>2</sub>O and C<sub>2</sub>H<sub>2</sub> will be shown illustrating that new information is available by using longer wavelength fields. Next we will discuss the use of two colour fields of either commensurate (e.g. 1300nm/650nm) or incommensurate frequencies (e.g. 1300nm/800nm) to enhance HHG efficiency in atoms. In both case significant efficiency gains are observed through the use of two colour fields up to photon energies ~100eV. Finally we will discuss our recent theoretical treatment of the best waveform for HHG and present practical routes to approaching this ideal.