

Abstract Submitted
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Macroscopic phase matching condition of higher order harmonics generation¹ SUDIPTA MONDAL, J R Macdonald Laboratory, Kansas State University, JAN TROSS, PHILIPP KLAUS, J R Macdonald Laboratory, Kansas State University and Institut für Kerphysic, Johann Wolfgang Goethe-Universität, FREDERIC CONDIN, J R Macdonald Laboratory, Kansas State University and Eberhard Karls Universität Tübingen, CARLOS TRALLERO, J R Macdonald Laboratory, Kansas State University — We perform a quantitative study to understand the role of phase matching on higher order harmonics generation. Higher order harmonics are mainly generated via the interaction of high intensity ultrashort laser pulses with gas medium. With the advance in high harmonics generation studies, harmonics are now being used as a probe in atomic, molecular studies. Higher order harmonics generation is a macroscopic phenomenon and experiences phase matching conditions. By changing lens position, we change Gouy phase of driving laser and by clipping the driving beam with an iris of adjustable diameter, we change transverse spatial phase. We observed two preferred regions of phase matching as we move the lens position in propagation direction. The harmonic spectrum and yield changes drastically as we move the lens in propagation direction. We have noticed individual harmonics follow different phase matching conditions. Spatial modification of the driving laser changes the phase matching conditions dramatically and preferred regions of phase matching are redistributed. Also the total harmonic yield can be increased by optimizing the spatial clipping of the driving laser.

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