

Accepted Manuscript

Title: Multiple refocusing of femtosecond filamentation in air: experiment and simulation

Authors: Lanzhi Zhang, Tingting Xi, Zuoqiang Hao

PII: S0030-4026(17)30760-X

DOI: <http://dx.doi.org/doi:10.1016/j.ijleo.2017.06.091>

Reference: IJLEO 59354

To appear in:

Received date: 31-3-2017

Accepted date: 21-6-2017

Please cite this article as: Lanzhi Zhang, Tingting Xi, Zuoqiang Hao, Multiple refocusing of femtosecond filamentation in air: experiment and simulation, *Optik - International Journal for Light and Electron Optics* <http://dx.doi.org/10.1016/j.ijleo.2017.06.091>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Multiple refocusing of femtosecond filamentation in air: experiment and simulation

Lanzhi Zhang^a, Tingting Xi^{b,*}, Zuoqiang Hao^{a,*}

^a*School of Science, Changchun University of Science and Technology, Changchun 130022, China*

^b*School of Physics, University of Chinese Academy of Sciences, Beijing 101407, China*

* Corresponding authors.

E-mail addresses: zqhao@cust.edu.cn (Z.Q. Hao), ttxi@ucas.ac.cn (T.T. Xi).

Abstract

Multiple refocusing of intense femtosecond laser pulses in air was studied both experimentally and numerically. Using fluorescence measurement and acoustic diagnostics simultaneously, filamentation and multiple refocusing of laser pulses were observed. It is found that the refocusing phenomenon is attributed to the dynamic transformation of laser energy over the transverse beam section. The roles of the different regions of the beam cross section were further analyzed.

Keywords: Filamentation, Multiple refocusing, Energy reservoir

1. Introduction

For sufficiently high laser intensities, air itself can be considered as a nonlinear optical medium. When an intense femtosecond laser pulse propagates in air, the beam self-focuses due to Kerr effect. When the laser power exceeds a critical power of about 10 GW in air, the self-focusing effect overcomes diffraction and leads to the

Download English Version:

<https://daneshyari.com/en/article/5024942>

Download Persian Version:

<https://daneshyari.com/article/5024942>

[Daneshyari.com](https://daneshyari.com)