

Abstract Submitted  
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**Systematic investigation of plasma filaments generated by Sub-TW laser pulses in N<sub>2</sub> gases** TAKAMITSU OTSUKA, TAKEHARU HOMMYO, KAZUKI OGURI, YUSUKE HYUGA, Utsunomiya Univ, YASUHIKO SENTOKU, University of Nevada, NOBORU YUGAMI, Utsunomiya Univ — Intense ultrashort laser pulses propagating through gases and plasmas induce many interesting physical phenomena such as optical Kerr self-focusing, diffraction, and plasma induced defocusing, resulting in the formation of plasma filaments. Because the filaments can extend the Rayleigh length at high intensity, it is applicable to a wide range of applications, e.g. laser wakefield acceleration, and THz radiation. However, the characteristics and dynamics are not well defined, especially for laser-generated plasma filaments formed at lower gas pressure region. In this work, we have studied characteristics of plasma filament generated by a femtosecond laser pulse with less than critical power for giving rise to the relativistic effect. Plasma densities in the filament were observed using an interferometer under various conditions and compared with 1D-PIC calculation results. The experimental results agreed well with numerical calculation results. Shadowgraphs were also taken, and complex structures were observed in filaments formed under certain conditions. In this presentation the experimental results obtained and the results of the numerical calculations results will be compared.

Takamitsu Otsuka  
Utsunomiya Univ

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