Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Visualization of bubble formation induced by femtosecond laser pulses in water/acetone on a time scale from sub-picosecond to microseconds YUKI MIZUSHIMA, Graduate school of Science and Techonology, Shizuoka University, TAKAYUKI SAITO, Research Institute of Green Science and Technology, Shizuoka University — Laser induced bubble formation is usually understood as a trigger pulled by a plasma formation in a bulk media. During the plasma growth, normally, bright light emission due to excitation of the energy state of the electrons in the molecules can be observed. However, femtosecond laser pulses (fs pulses) generate bubbles through a process without bright light emission. The fs pulse leads extraordinary phenomena due to their extremely higher energy density than usual laser pulses (nano- or pico-second). We think the bubble formation by fs pulses must be different from the ordinary laser-induced cavitation. In this study, a single fs pulse was focused on water and acetone in a glass cell through several types of lens. We visualized bubble formation processes from sub-picosecond to microsecond order through time-resolved visualization. We found out a strange time-series process of refraction index changes of the media irradiated by the fs pulse: the bubble nucleation, rapid growth of bubble nucleation and interesting bubble properties. Based on these results, we will discuss a relationship between those and fs pulse peak intensity, and differences in bubble formation in water and acetone.

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Date submitted: 30 Jul 2014 Electronic form version 1.4