



## The Relationship between the Strain and the Fluorescence Lifetime of Fluorescence Material

K.Nogawa<sup>1</sup>, T. Tsuji<sup>1</sup>, H.Toda<sup>1</sup>, K.Yoshino<sup>1</sup>

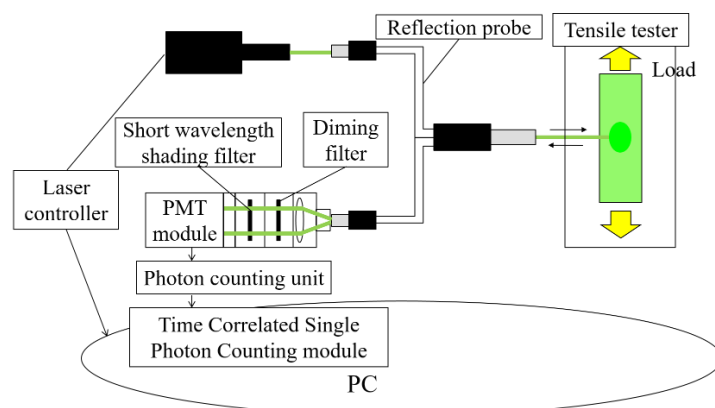
<sup>\*1</sup>Department of Precision Mechanics, Faculty Science and Engineering, Chuo University, 1-13-27 Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan

Corresponding Author E-mail: a15.jg53@g.chuo-u.ac.jp

### Abstract

This study was made to propose a new method to measure the stress without contact. In this research, we focus on fluorescence as the new stress measurement method. Fluorescence lifetime is the average time that fluorescence materials remain excited state. Fluorescence lifetime of objects varies depending on its strain. So, we study relationship between fluorescence lifetime and strain by synchronizing the value of fluorescence lifetime with the strain of specimen containing fluorescent material.

Figure 1 shows an experimental device. First, we excited a specimen with picosecond laser. The specimen was pulled by tensile tester. Then, Fluorescence of the specimen came into photon multiplier tube and it was measured by photon counting unit. In this study, we use Time-Correlated Single Photon Counting (TCSPC) to measure fluorescence lifetime. This is one of the most sensitive method to measure weak light like fluorescence.



**Fig.1 experimental device**

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