

## RESEARCHES ON ULTRASHORT PULSE LASERS IN JAPAN

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A review of researches on ultrashort pulse laser and its applications in Japan will be presented.

A technique for chirp-compensation in a CPM laser is presented. By using the change of the incident angle to multilayer dielectric cavity mirrors, the intracavity second-order dispersion  $\theta$  is adjusted without any additional elements. It is confirmed that the optimum value of  $\theta = +2.1 \times 10^{-29} \text{ s}^2$  obtained when up-chirp was compensated and pulses as short as 44 fs were generated is reasonable, by comparison to analytic results of chirp behaviors. In addition, the effect of the third-order dispersion  $\theta$  at the optimum value of  $\theta$  on pulses is evaluated.<sup>1),2)</sup>

Two experimental studies are presented illustrating applications of organic materials of high nonlinear refractive index to femtosecond light-pulse technology.<sup>3)</sup>

The picosecond time-resolved fluorescence decay  $I(t)$  and spectra  $I(\lambda, t)$  for hematoporphyrin derivative (HPD) in a phosphate buffer saline aqueous solution at different concentrations and *in vitro* are measured by a two-dimensional synchroscan streak camera with a mode-locked CW dye laser.<sup>4),5)</sup>

It is experimentally verified that a synchroscan streak camera, incorporating a microchannel plate and synchronizing with UV picosecond pulses generated inside the cavity of a mode-locked CW ring dye laser, has enough sensitivity to detect picosecond emission phenomena in the region of a single-photon event.<sup>6),7)</sup>

### References

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