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**All-solid-state, ultraviolet, high power laser system using Ce:LiCAF as a gain medium** NOBUHIKO SARUKURA, Osaka University, SHINGO ONO, HIDETOSHI MURAKAMI, ALEX QUEMA, ELMER ESTACIO, Institute for Molecular Science, TSUGUO FUKUDA, Tohoku University —
High peak-power, femtosecond, ultraviolet (UV) lasers have attracted new interest. Chirped pulse amplification (CPA) in the UV region has been demonstrated using Ce:LiCaAlF6 (Ce:LiCAF) crystal as the gain medium. The peak power of the amplified and compressed pulse (115 fs) reached 30 GW at 290 nm. To increase the peak power to the terawatt (TW) level, further pulse compression is desired. Since Ce:LiCAF has a tunability of 281nm to 315nm, it holds promise for 3-fs pulse generation which are required for seeding TW-class Ce:LiCAF lasers. The pulse-width of the frequency-tripled Ti:sapphire regenerative amplifier was measured to be 210 fs. The seed pulses were then focused into a hollow fiber filled with argon to spectrally broaden the pulses due to self-phase-modulation. The pulses were then compressed to 25 fs by dispersion-compensation. The fourth harmonics of a Nd:YAG laser (266 nm) is an ideal pump source as it falls within the absorption band Ce:LiCAF. We have generated 430 mJ fourth harmonics with a total conversion efficiency of 30.5% using Li2B4O7(LB4) crystals. A Ce:LiCAFdouble-pass power-amplifier was then designed with a peak energy of 98 mJ for a 13 mJ seed pulse and an extraction efficiency of 25%.

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