

Ce³⁺-Activated Fluoride Crystals as Prospective Active Media for Widely Tunable Ultraviolet Ultrafast Lasers with Direct 10-ns Pumping

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Abstract

New possibilities have been investigated for recently developed solid-state tunable ultraviolet (UV) laser materials such as Ce³⁺ ion-activated LuLiF₄ (LLF) and LiCaAlF₆ (LiCAF). With their broad-gain width, demonstrated reliability, and high efficiency, they are attractive for ultrashort pulse generation and amplification. To prove that, we have demonstrated UV picosecond-pulse amplification using Ce : LLF. For such new laser materials, we proposed a passive self-injection seeding scheme for the direct generation of short-pulse trains, which does not require CW-operation capability or an external short-pulse seeding laser. Using this simple scheme, a UV sub-nanosecond pulse train is directly and passively generated from Ce:LLF pumped by a standard 10-ns KrF excimer laser, and Ce : LiCAF pumped by the fourth harmonic of a conventional 10-ns Q-switched Nd : YAG laser. © 1995 IEEE

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