

MULTI-WAVELENGTH LAMP PUMPED LISRALF6: CR LASER WITH BRAGG GRATING

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The research introduces a multi-wavelength mode for pulse generation in a Cr:LiSAF laser, offering promising opportunities for various applications in the field of laser technologies. Generation of two or more wavelengths is accomplished within a system of optically coupled resonators. An intra-cavity Bragg grating allows to change emission wavelength within the cavity, enabling precise control of the frequency difference during the generation mode of two non-commensurate wavelengths. Free generation mode, as well as passive and active Q-switch modes, have been obtained.

The experimental results demonstrate a substantial and highly tunable wavelength tuning range from 795 nm to 930 nm in the free-running mode, with a remarkably minimally registered tuning step of 0.1 nm. Additionally, a minimal separation gap of only 3.6 nm (833 nm and 836.6 nm) is observed in the experiment involving passive Q-switch mode through the use of an LiF:F2 shutter, with a full width at half maximum (FWHM) of each wavelength spanning from 1.1 to 1.4 nm.

The obtained results indicate the strong feasibility of implementing these modes for tasks of pump-probe sample analysis, holography, spectroscopy, and the development of differential absorption lidars.