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标题: Directly diode-pumped femtosecond laser based on an Yb:KYW crystal
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摘要: Ultrashort pulse laser systems are widely used in many areas such as microprocessing of various materials, the generation of terahertz radiation, nonlinear optics, medical tomography, chemistry, and biology due to the high peak power and large spectral width. For a practical usage of the femtosecond lasers, they must be fairly compact and stable. These conditions are most fully met when laser media are used that allow direct pumping with the radiation from semiconductor injection lasers, which are more compact, reliable, and inexpensive than pumping with solid-state lasers.
Since Ytterbium-doped crystals have a broad luminescence band for generating femtosecond pulses less than 500 fs wide, they are attractive as materials for lasers with direct diode pumping. Moreover, the position of the central luminescence wavelength of Yb:KGW and Yb:KYW crystals makes them promising priming sources of femtosecond pulses for amplifiers that operate at wavelengths close to 1 mu m (Yb:KGW, Yb-glass, Nd-glass, Yb:YAG, etc.)
We developed a femtosecond generator based on the Yb:KYW crystal with direct pumping by the radiation of a laser diode with fiber output of the pump radiation. The use of such pumping, as well as of chirped mirrors to compensate intracavity dispersion, made it possible to generate a continuous sequence of optical pulses 90 fs wide at a frequency of 87.8 MHz with a mean radiation power of more than 1 W. The product of the pulse width by the spectral width is close to the theoretical limit, and this indicates that there is no frequency modulation.
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