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激光技术

高效三通光参量啁啾脉冲放大器

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摘要：

为了提高信号光与抽运光在时域上的匹配，提高放大系统的增益，提出了三通光参量啁啾脉冲放大的方法。实验中，信号光在一块晶体内被一抽运光在完全相位匹配的条件下放大了三次，总放大增益为3.7×107，能量晃动小于3%rms，放大后的信号光谱宽为30nm，压缩后的信号光脉宽为82fs。实验结果表明：采用三通光参量啁啾脉冲放大方法，有效地抑制了放大过程中参量荧光对放大过程的影响，在抽运光强为350MW/cm2时，参量荧光仅占输出总能量的1%。

关键词： 激光放大器 参量振荡器与放大器 超快激光 超快技术

High efficient triple-passed optical parametric chirped pulse amplification

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Abstract:

A triple-passed non-collinear optical parametric chirped pulse amplifier is presented. The signal was triple-passed amplified in a single nonlinear crystal by a long pump pulse, in which the signal and pump pulses of each pass were completely phase matched in the plane to have the maximum of the effective nonlinearity. The total net gain higher than 3.7×107, single pulse energy exceeding 3.7mJ with fluctuations less than 3%rms, 30nm amplified signal spectrum and recompressed pulse duration of 82fs were achieved. With this system, the parametric fluorescence is less than 1% of the total output pulse energy when the pump intensity is 350MW/cm2.

Keywords: laser amplifier parametric oscillators and amplifiers ultra-fast laser ultra-fast technology

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