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Title: Dual-wavelength high-power diode laser system based on an external-cavity tapered amplifier with tunable frequency difference

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Abstract: A dual-wavelength high-power semiconductor laser system based on a tapered amplifier with double-Littrow external cavity is demonstrated around 800 nm. The two wavelengths can be tuned individually, and the frequency difference of the two wavelengths is tunable from 0.5 to 10.0 THz. To our knowledge, this is the broadest tuning range of the frequency difference from a dual-wavelength diode laser system. The spectrum, output power, and beam quality of the diode laser system are characterized. The power stability of each wavelength is measured, and the power fluctuations of the two wavelengths are almost of opposite phase. The simultaneous emission of the two wavelengths is verified by a sum-frequency generation experiment in a bismuth triborate nonlinear crystal. ©copy; 2012 Optical Society of America.

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