

Abstract Submitted
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Frequency-shifted feedback amplifier for broadband laser cooling

MICHAEL LIM, ALEXANDER VAN KOOY, MICHAEL YANAKAS, Department of Physics and Astronomy, Rowan University — We have developed a compact, all-solid state laser amplifier for generating asymmetric sidebands with controlled number and spacing of optical frequencies. The gain element is a tapered semiconductor amplifier, used in conjunction with an acousto-optic modulator that generates red-detuned feedback frequencies. This results in asymmetric sidebands that are all lower in optical frequency than the narrowband seed laser frequency. The output laser spectrum has a well-defined edge (the input laser frequency) and multiple sidebands whose number, frequency spacing, and power are fully controlled by the seed laser characteristics and a single radio frequency input. The number of sidebands can be varied in a controlled way, and the output optical power is variable up to the Watt level of the amplifier chip. The system will be used for broadband laser cooling.

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