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【415】Electrically Pumped Difference Frequency Generation in Bragg-reflection Waveguides

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Nonlinear optical processes are widely used in quantum communication and computation, as well as laser engineering. In particular, difference frequency generation can be utilized to erase spectral distinguishability between single photons or generate laser light in otherwise hard to reach wavelength regimes. In this work, we present an AlGaAs Bragg-reflection waveguide with an embedded AlInGaAs quantum dot laser. By setting the temperature of this microscopic device, we allow for phase-matching between the internal laser emission and the interacting light in the telecom wavelength range. With an external, tunable telecom laser we investigate the generated photons from 1540 nm to 1630 nm and determine a nonlinear conversion efficiency of 0.64(21) %/W/cm^2.

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