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In an external cavity (EC) quantum cascade laser, the quantum cascade device serves as the laser gain medium. One, or both, of the waveguide facets has an anti-reflection coating that defeats the optical cavity action of the cleaved facets. Mirrors are then arranged in a configuration external to the QC device to create the optical cavity.

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Based on a quantum cascade laser (QCL) emitting mid-infrared light, the researchers developed a basic optical neuron system operating 10,000  $\times$  faster than biological neurons. Their report is...

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Based on a quantum cascade laser (QCL) emitting mid- infrared light, the researchers developed a basic optical neuron system operating 10,000 times faster than biological neurons. Their report is...

## ~~Quantum cascade lasers (QCLs) exhibit extreme pulses~~

Lasers are amazing and they have millions of potential applications. However, some lasers can only work in presine lab environments, which limits their use. For example, quantum cascade laser ...

## ~~Amazing breakthrough — terahertz quantum cascade lasers ...~~

Quantum cascade lasers (QCLs) are semiconductor lasers that emit in the mid- to far-infrared portion of the electromagnetic spectrum and were first demonstrated by Jerome Faist, Federico Capasso, Deborah Sivco, Carlo Sirtori, Albert Hutchinson, and Alfred Cho at Bell Laboratories in 1994. Unlike typical interband semiconductor lasers that emit electromagnetic radiation through the recombination of electron – hole pairs across the material band gap, QCLs are unipolar and laser emission is ...

## ~~Quantum\_cascade\_laser — chemeuropa.com~~

A Quantum Cascade Laser (QCL) is a type of semiconductor laser that emits light in the mid- to far-infrared portion of the electromagnetic spectrum. Quantum cascade lasers offer many benefits: They are tunable across the mid-infrared spectrum from 5.5 to 11.0  $\mu\text{m}$  (900  $\text{cm}^{-1}$  to 1800  $\text{cm}^{-1}$ ); provide a rapid response time; and provide spectral brightness that is significantly brighter than even a ...

## ~~Terahertz Quantum Cascade Laser Operates Outside Lab ...~~

Frequency combs are widely-used, high-precision tools for measuring and detecting different frequencies

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~~Applications~~ — of light. Unlike conventional lasers, which emit a single frequency, these lasers emit multiple frequencies in lockstep, evenly spaced to resemble the teeth of a comb. We study in particular quantum cascade laser frequency combs operating in a strategic region of the electromagnetic spectrum - the mid-infrared - which allows to detect molecular fingerprints of plenty ...

~~Frequency combs, quantum cascade lasers, and RF photonics ...~~

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A strain-balanced, AlInAs/InGaAs/InP quantum cascade laser structure, designed for light emission at 4.0  $\mu\text{m}$  using nonresonant extraction design approach, was grown by molecular beam epitaxy. Laser devices were processed in buried heterostructure geometry. An air-cooled laser system incorporating a 10-mm  $\times$  11.5- $\mu\text{m}$  laser with antireflection-coated front facet and high-reflection-coated back ...

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Terahertz quantum cascade lasers, tiny chip-embedded semiconductor laser devices, were first invented in 2002, but adapting them to operate far above 200 K proved to be so difficult that many ...

~~Researchers develop a high-power, portable terahertz laser~~

Quantum cascade lasers (QCLs) are a type of semiconductor laser which utilizes epitaxially grown quantum wells that contain electrons in lasing states. They were first demonstrated in 1994 by the Bell Labs Team of Jérôme Faist, Federico Capasso, Deborah Sivco, Carlo Sirtori, Albert Hutchinson, and Alfred Cho [1].

~~Quantum Cascade Laser Technology (QCLs) | QCL Chips ...~~

The recent demonstration of external cavity quantum cascade lasers with optical feedback, controlled by an acousto-optic modulator, paves the way to ruggedized infrared laser systems with the capability of tuning the emission wavelength on a microsecond scale. Such systems are of great importance [...] Read more.

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Quantum cascade lasers and difference-frequency-based laser sources overcome this problem by offering higher signal intensities. In particular, the difference-frequency method is a powerful way to...

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Quantum cascade lasers (QCLs) are based on a fundamentally different principle to ' classic ' semiconductor lasers, that is, they use only one type of charge carriers, electrons, using intersubband transitions, so they can be called unipolar lasers. QCLs were conceived in the early 1970s.

## ~~An Overview on Quantum Cascade Lasers: Origins and ...~~

The optical and thermal properties of quantum cascade lasers (QCLs) are investigated through the development of comprehensive theoretical models. The optical properties of various multilayer quantum cascade laser waveguides are investigated by solving Maxwell ' s equations using a transfer-matrix method. The complex material refractive

## ~~The optical and thermal properties of quantum cascade lasers~~

We report on the generation of picosecond self – mode-locked pulses from midinfrared quantum cascade lasers, at wavelengths within the important molecular fingerprint region. These devices are based...

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