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Part 3 - Quantum Cascade Lasers: Compact Widely Tailorable Light Sources from 3 to 300 μm Quantum Cascade Lasers And Optical

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

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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.

~~Quantum cascade laser~~

~~Wikipedia~~

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

~~Extreme events in quantum cascade lasers: Extreme events ...~~

Based on a quantum cascade

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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—
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~~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 ...

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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 μm (900 cm^{-1} to 1800

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~~

~~...~~

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Optical Frequency combs are widely-used, high-precision tools for measuring and detecting different frequencies – a.k.a. colors – 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~~

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~~Quantum cascade lasers~~

A strain-balanced,
AlInAs/InGaAs/InP quantum
cascade laser structure,
designed for light emission

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at 4.0 μm 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- μm laser with antireflection-coated front facet and high-reflection-coated back ...

~~High performance continuous-wave room temperature 4.0 μm~~

...

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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~~

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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,

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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

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(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

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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...

~~Self Mode Locking of Quantum Cascade Lasers with Giant~~

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