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Mid-infrared interband cascade lasers

Interband cascade lasers are promising mid-infrared semiconductor lasers for the 3-6 μm spectral range and beyond. They are robust, compact, they can be operated at ambient temperatures and they require low input powers for operation. Therefore, they are ideal for gas sensing of hydrocarbons. Combining interband transitions utilized in diode lasers with a cascading scheme widely exploited in inter sub-band transition based quantum cascade lasers, interband cascade lasers can operate at threshold current densities around or below 100 Acm^{-2} at room temperature. By applying distributed feedback gratings, single mode operation in continuous wave mode at room temperature can be routinely obtained providing more than mW output powers. Side mode suppression ratios of more than 20 dB and wavelength tunability by substrate temperature and drive current make these devices optimally suited for resonant gas absorption measurements.

Biography

Sven Hofling received his diploma degree from the University of Applied Physics and his PhD degree from Würzburg University. During his scientific career, he has been affiliated with the Fraunhofer Institute of Applied Solid State Physics, Stanford University, the University of Tokyo and the National Institute of Informatics in Tokyo. He is now Professor at the University of St Andrews in Scotland and heading the Quantum Physics and Quantum Engineering group there. He has published about 200 papers in peer reviewed scientific journals including *Nature*, *Nat. Photonics*, *Nat. Materials*, *Nat. Nanotechnology*, *Nature Physics* and *Nature Communications*.

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