EXTERNAL CAVITY QUANTUM CASCADE LASER WITH SCANNING MOEMS GRATING

The miniaturized quantum cascade lasers (µEC-QCL) developed at Fraunhofer IAF and IPMS cover a wide wavelength range and a broad spectral tuning range at a high scan rate. The micro-mechanically manufactured diffraction grating developed at Fraunhofer IPMS acts as the quantum cascade laser’s variable frequency external resonator. It allows the fast tuning of laser wavelengths, with a large variable frequency range.

Therefore they open completely new ways for infrared spectroscopy: from stand-off detection of explosives to time-dependent measurements of chemical reactions in aqueous solutions the quantum cascade lasers offer a wide range of applications.

Features
- Wavelength range from 4 – 11 µm
- Spectrally broad tunable (≥ 30% of central wavelength)
- Up to 2000 spectra per second due scanning MOEMS grating
- Typical output power 10 – 100 mW
- Line width < 2 cm⁻¹ (pulsed)
- Pulse repetition rate 300 kHz, pulse length 100 ns
- Compact, robust modules
- Collimated output beam

Applications
- Detection of hazardous substances
- Infrared spectroscopy of liquids
- Continuous measurements in in- and online process control
- Food safety control
- Medical applications
- Environmental analysis