

The logo features the word "MIRPHAB" in a bold, dark grey, sans-serif font. A red arc is positioned to the left of the text, starting from the top of the letter 'M' and curving upwards and to the right, ending above the letter 'P'.

MIRPHAB

CHEMICAL SENSING AND SPECTROSCOPY

The MIRPHAB Consortium

Leading European industrial suppliers of MIR photonics components and first-class European R&D institutes with processing facilities capable of carrying out pilot line production.

LASER TECH

- Design
- Fabrication
- Test of MIR sources: ICL, QCL in EC or DFB configuration.



HIGH LEVEL DESIGN

PDK tools for automated design of novel system concepts



PIC CIRCUITS

- Design
- Fabrication
- Test of passive photonics components on Si, including integration of ICL and QCL sources.



DEMONSTRATION ACTIONS

Demonstration actions are carried out by industrial partners and driven by end-users's needs. Its functions is to validate the effectiveness of the full fabrication and supply chain.



DETECTORS

Development of novel generations of uncooled III-V based high performance detectors.



DISSEMINATION AND TRAINING

The whole prototyping and fabrication activity is supported by dissemination and training actions.

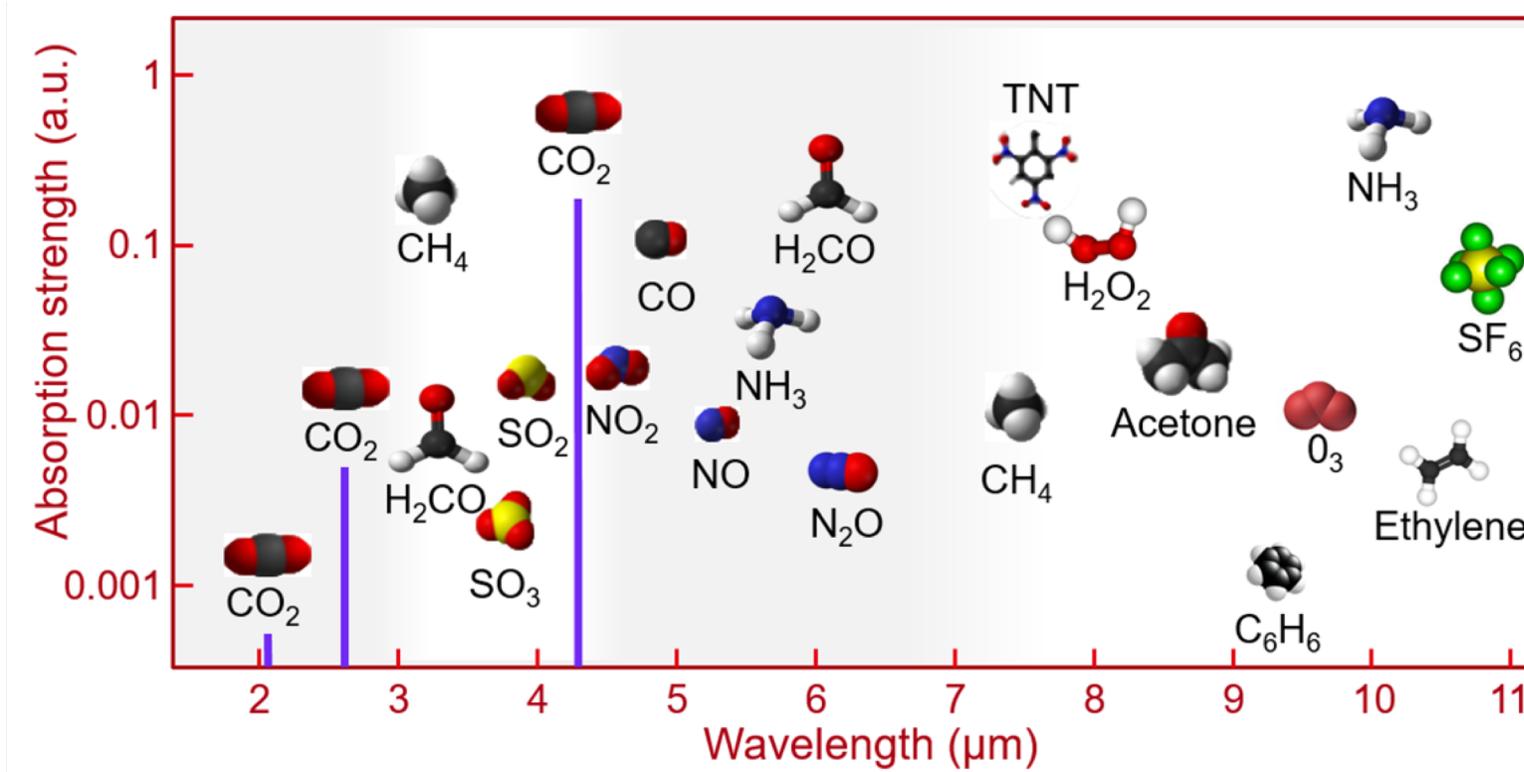


BUSSINES DEVELOPMENT

Coordination of the exploitation activities of the project.



Mid Infrared (MIR) light interacts strongly with molecular vibrations. In MIR, each molecule gives a unique adsorption spectrum providing a simple solution for sensing



The need for miniaturized sensors



Monitoring the quality of gas or oil during the extraction process.



On-line warning detection systems for leaks in gas distribution networks.



Protecting transport systems require new sensing tools to detect explosives or drugs.



More stringent environmental regulations will require cost efficient detection tools.



The future of diagnosis; non-invasive blood test, breath analysis and in-vivo imaging.

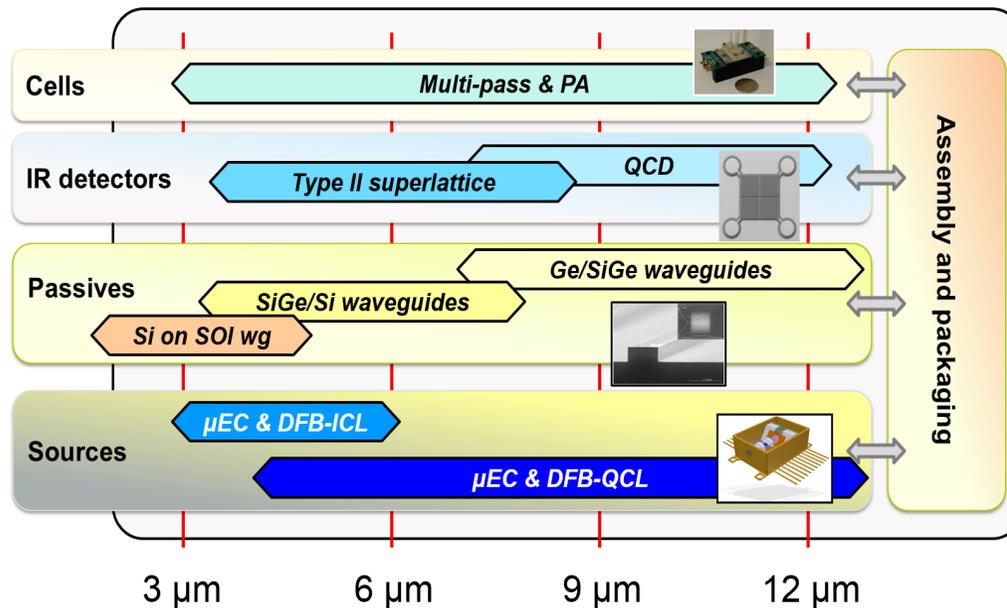
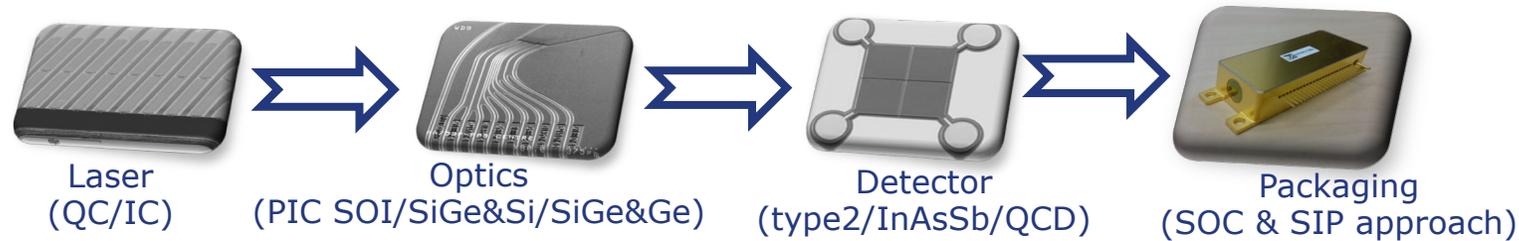


Vehicle embedded sensors will effectively control engine emissions.



The MIR Sensor System

The MIR Sensor System proposed by MIRPHAB consist of **light sources**, **passive components** and **IR detectors**.

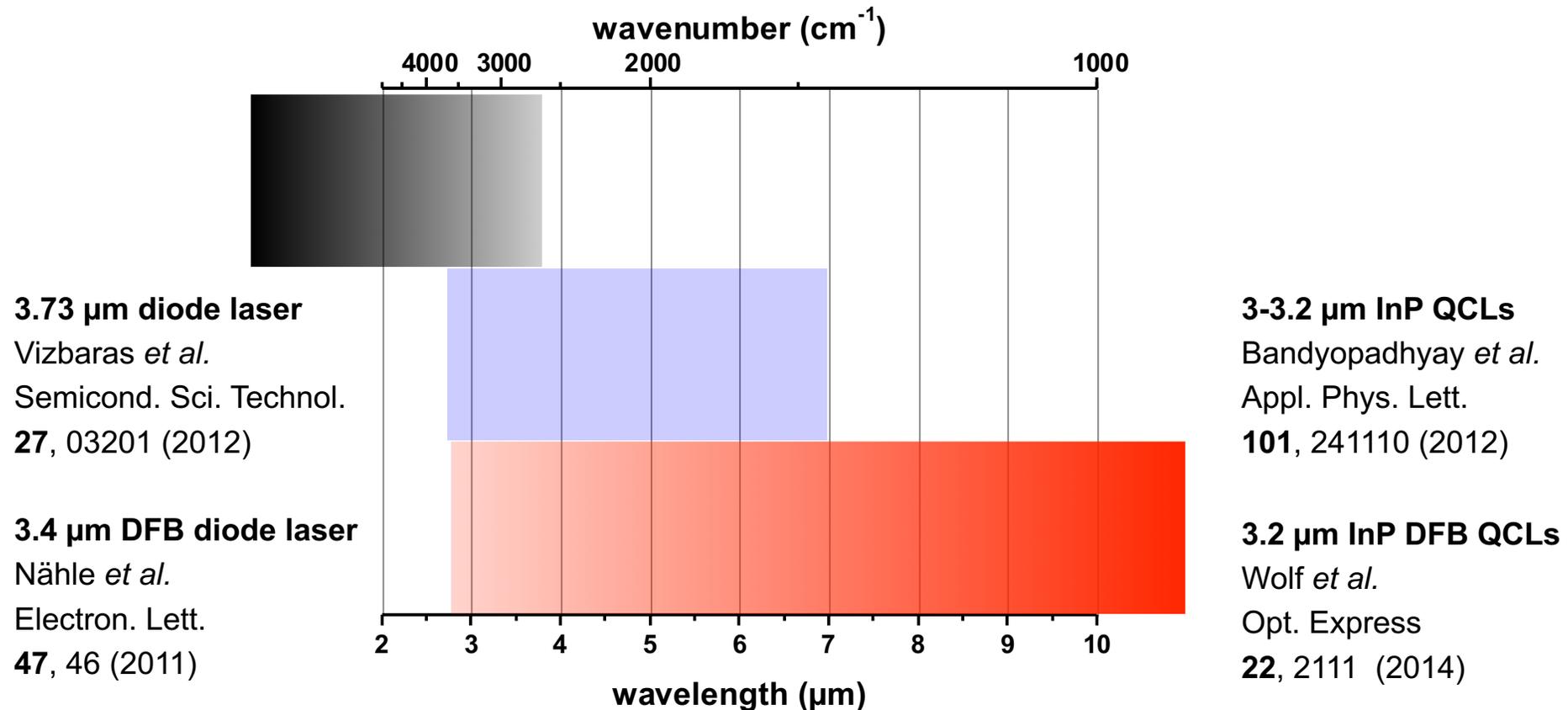


The wavelength at which the molecule to detect is absorbing will define the source, the PIC and the detection to be integrated in the sensor system.

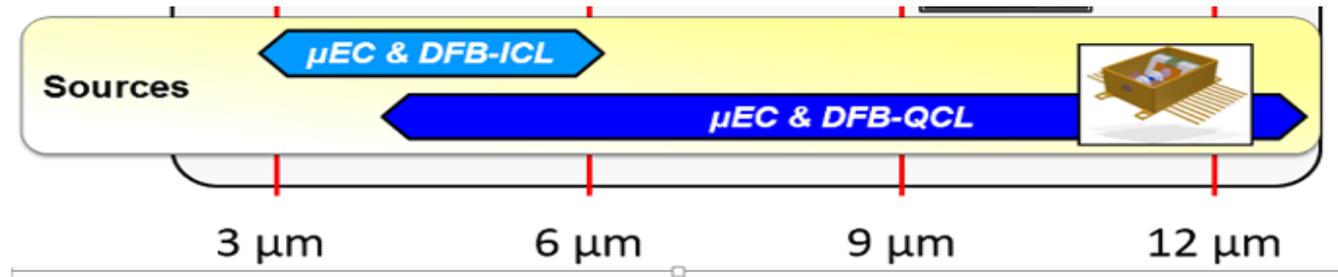
Semiconductor lasers in MIR

There are basically **three approaches** to cover this wavelength range

- **Diode Lasers**
- **Interband Cascade Lasers**
- **Quantum Cascade Lasers**



MIRPHAB Partners for MIR Sources



Nanosystems and
Technologies
GmbH

nanoplus

ICL based technology: DFBs, FP's Arrays



QCL based technology: DFBs, FP's, Arrays

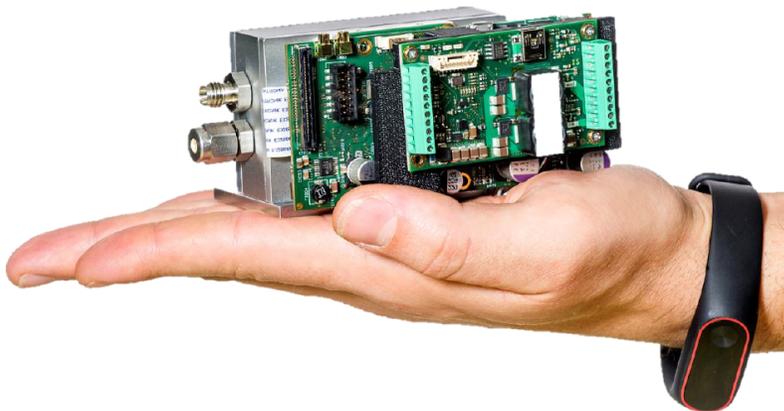
**ALPES
LASERS**

QCL based technology: Widely tunable QC-ET's



μ -external cavity lasers based on ICL & QCL's

MultiSense World's smallest QCL gas analyser



€

Small

Robust, no
maintenance

User
Friendly

Range: 0
to 100%

Sub ppm level in <1s

QCL lasers and
photoacoustics

Each module measures 2 molecules
All gases in the Mid-IR
(4-10 μ m) absorption band

NH ₃			
NO ₂	H ₂ O		
N ₂ O	SO ₂	CO	
NO	CH ₄	CO ₂	H ₂ CO

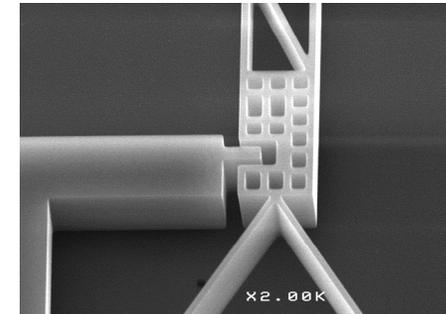
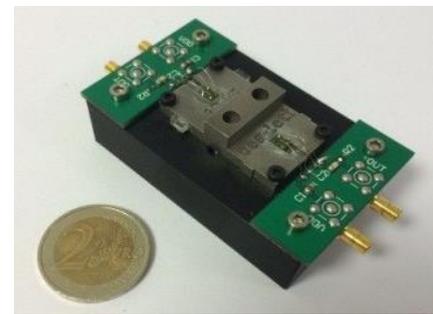
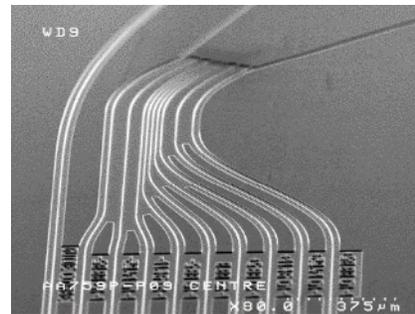
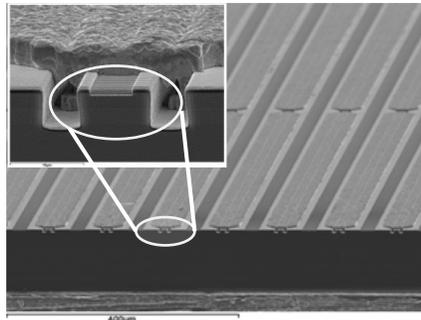
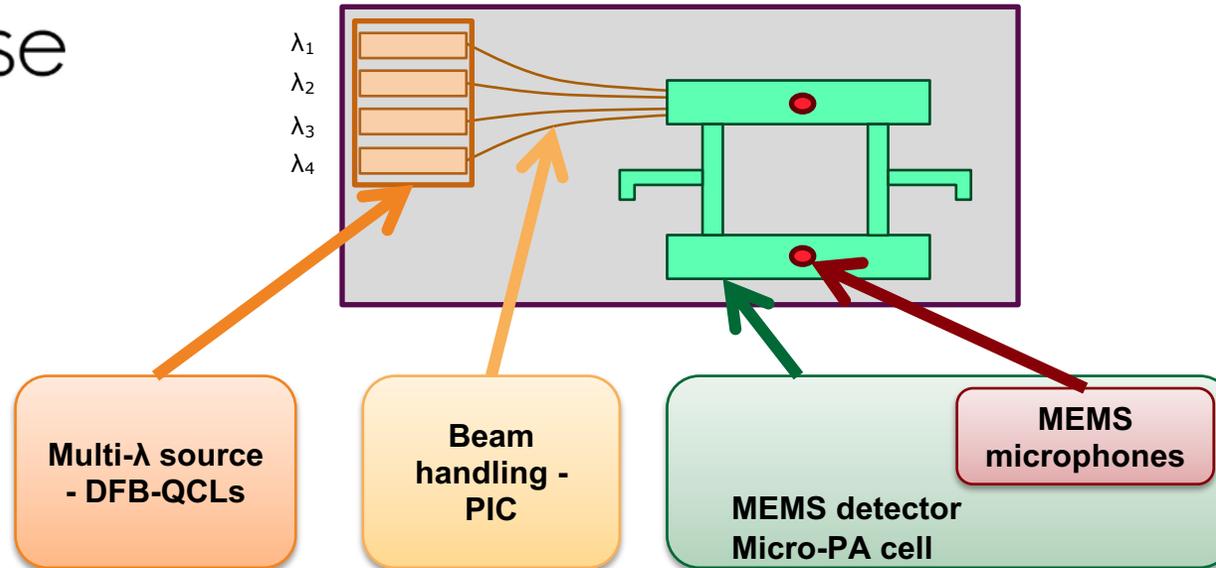


PHOTONICS²¹

PHOTONICS PUBLIC PRIVATE PARTNERSHIP

MIRPHAB

Micro Photoacoustic Multigas Spectroscopic Sensor



6. How MIRPHAB works?



Full info at www.mirphab.eu



You can apply for matching funding to develop your prototype





Diafir sensors are single use



It is possible to measure a liquid metabolic profile by placing a single drop (7 μ l) into the sensor

Diafir develops a rapid diagnostic orientation test of septic arthritis cases, based on the spectroscopic analysis of the infrared synovial fluid. This test allows detection in less than 10 minutes, versus 48H minimum now.



Non-Alcoholic SteatoHepatitis (or NASH) affects more than 5% of the population worldwide. DIAFIR, develops a non-invasive test based on the metabolic signature of NASH aiming to replace the current invasive procedure.



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