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Fiber Spectroscopy to analyze Food and Beverages

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FlexiSpec® fiber probes enable to monitor chemical reactions in-line & to run medical diagnostics in-vivo using all the key spectroscopy methods: ATR-absorption, diffuse reflection, Raman, fluorescence or their any combinations.

UNIQUE FIBER PROBES FOR PROCESS SPECTROSCOPY & MEDICAL DIAGNOSTICS
IN A BROAD 0.3-16 μm RANGE

Raman, Mid & Near InfraRed-Spectroscopy

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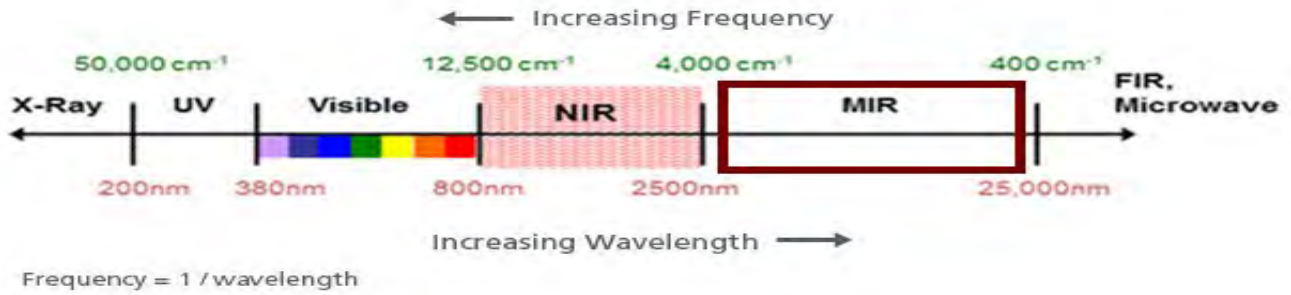
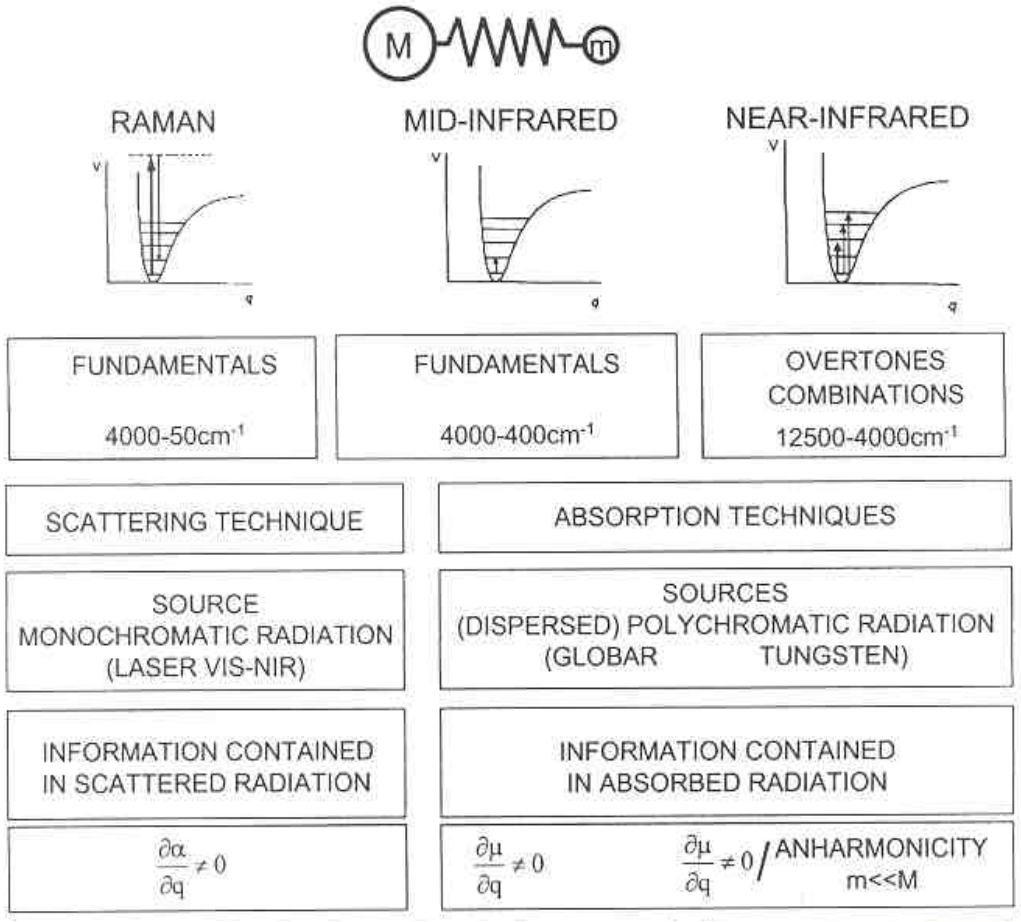
Voting results from Spectroscopy, July 19, 2011:

Which technique has been the most useful in your work?

Mid-IR - 57% / Raman - 32% / NIR - 11%





Choice of Spectral Range and Method

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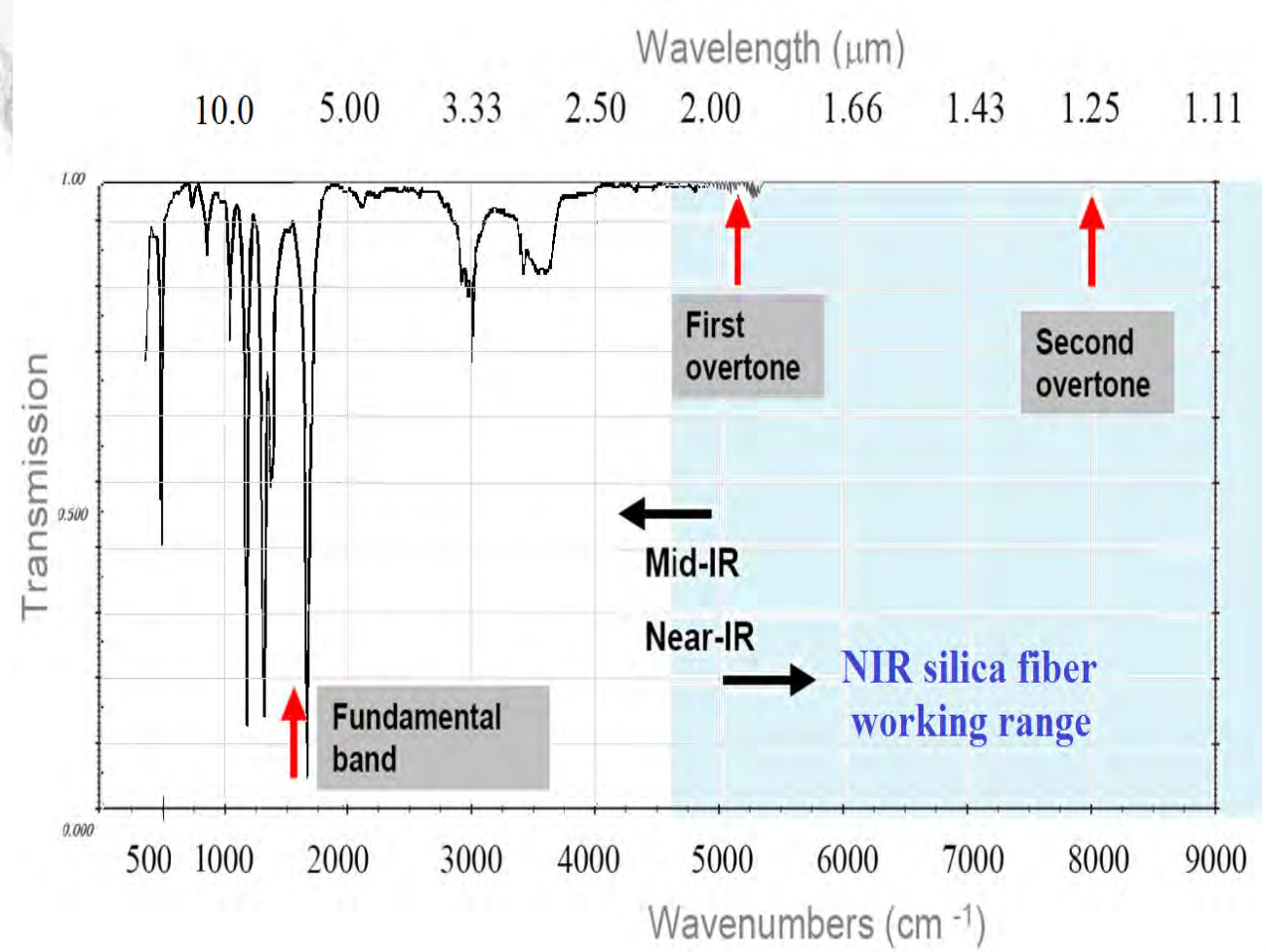
Optimal optical path length at the measurement depends on the substance absorption coefficient



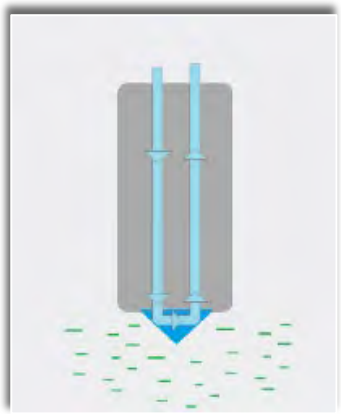
Example: Acetone Absorption Bands

The overall advantages of using FTIR analysis are that it provides rapid analysis data for better decision making in food and agriculture production processes.

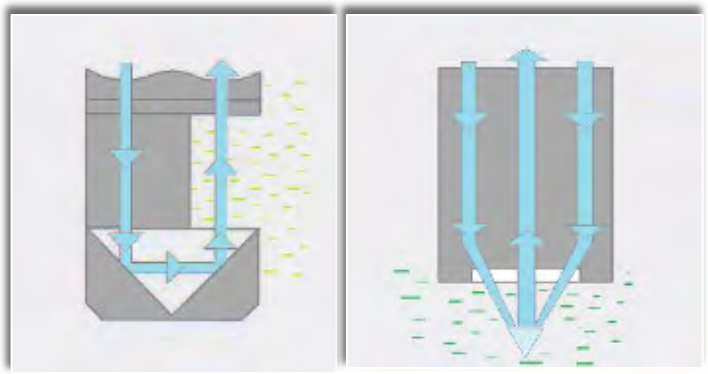
It is particularly useful for testing liquid samples such as milk and wine. Compared to traditional analysis methods it requires little or no sample preparation and no chemicals or consumables. It is non-destructive, operator friendly, fast, reliable and precise.

https://www.fossanalytics.com/news-articles/technologies/ftir-analysis

Mid IR range – ATR probes, optical path 1-10μm



Near IR range – transmission and reflection probes, optical path 1-10mm



3 Fiber Types to use for Process-Spectroscopy in for 0.3-16µm Range

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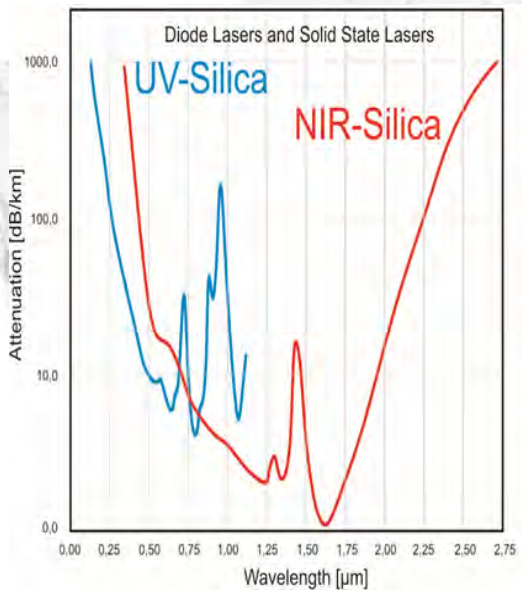
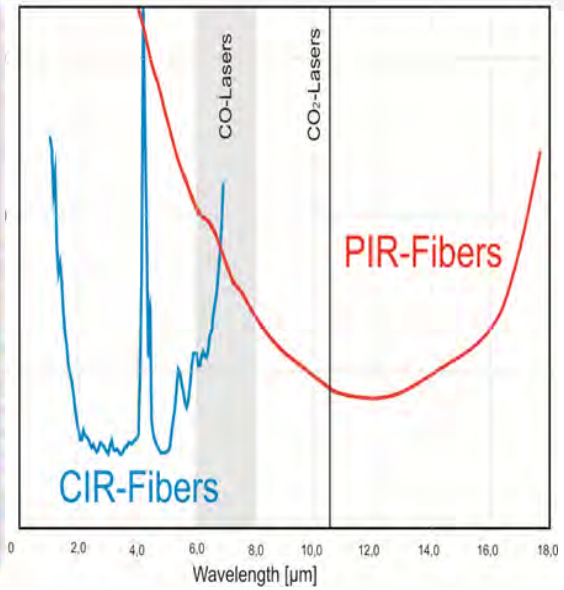
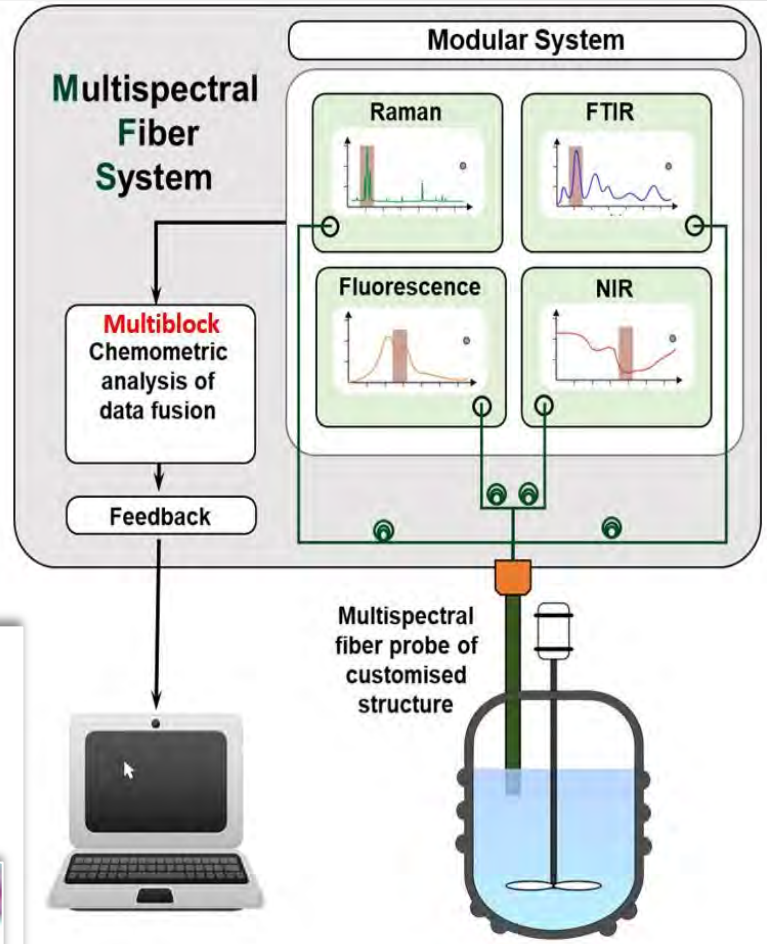
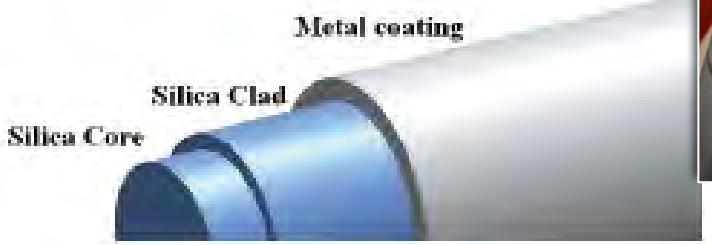






Alu- or Copper coating of Silica fibres enables to use them up to 350-700°C in 0.3-2,2µm range

Polycrystalline IR-fibres from Silver Halides are the very flexible and the best for Mid IR: 3-17µm



Multi-Spectral Fiber System using 4 Key Spectroscopy methods for Fiber Process Spectroscopy

Broad Variety of FTIR-spectrometers…

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…need additional work to collect, prepare and insert media sample into the sample chamber for bench spectrometers - or to bring the portable spectrometer close or in touch with the sample

Raw milk testing with MilkoScans from **FOSS**

From Bench FTIR to Process-FTIR-Spectrometers

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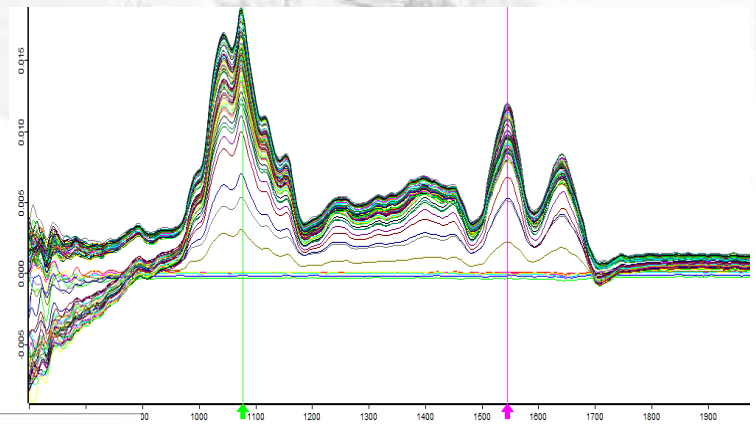
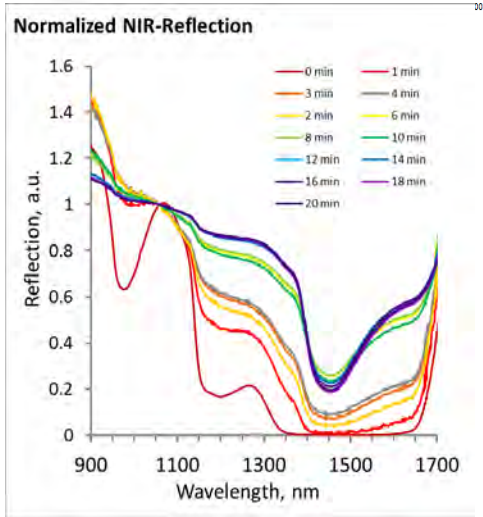
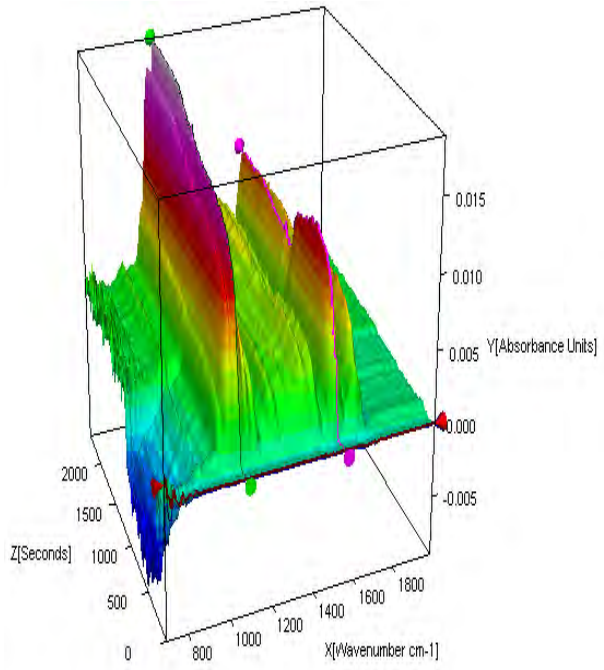
IR-Fiber Probes can be coupled with FTIR-spectrometer with & without sample chambers.
Mirror couplers enable to use bench spectrometer when installed in sample chamber.

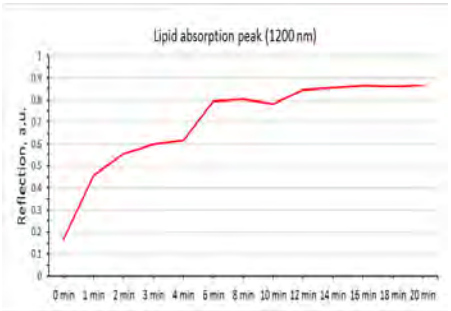
Milk Powder Dissolution







Mid IR-absorption change in 30min



Better Milk Standartisation with MILKOSTREAM™ FT from FOSS

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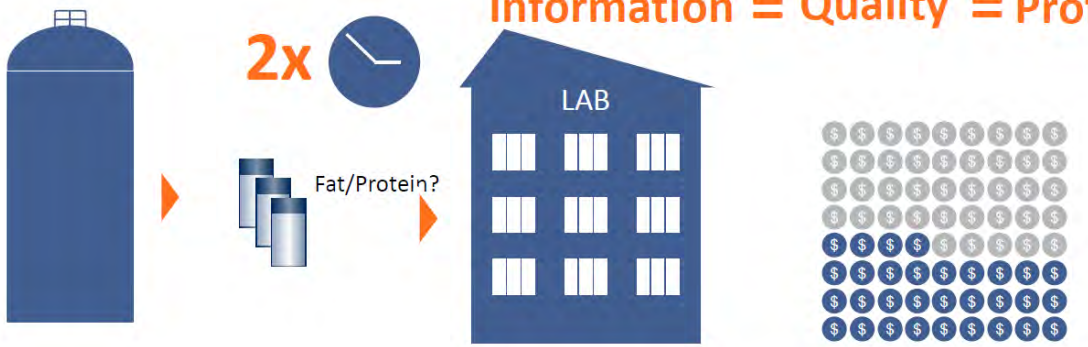
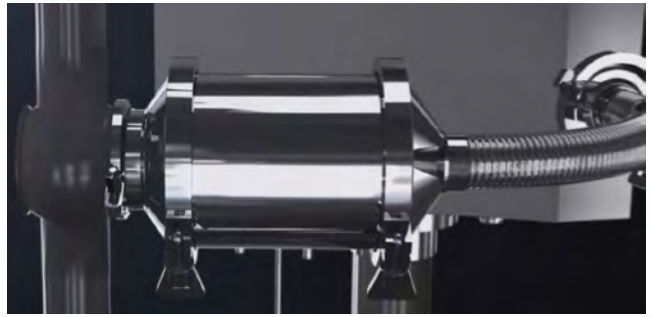


A measurement every 7 seconds



Parameters & performance

0 - 9 % fat
0 - 10 % protein
0 - 7 % lactose
0 - 20 % total solids
0 - 17 % solid non fat

Accuracy *: Fat, protein SEP: 0.05 %,Total solids, SNF, lactose SEP: 0.10 %

Repeatability *: Fat, protein: 0.03 %, Total solids, SNF, lactose: 0.05 %

Fiber Probes for TransFlexion and Diffused Reflection Spectroscopy

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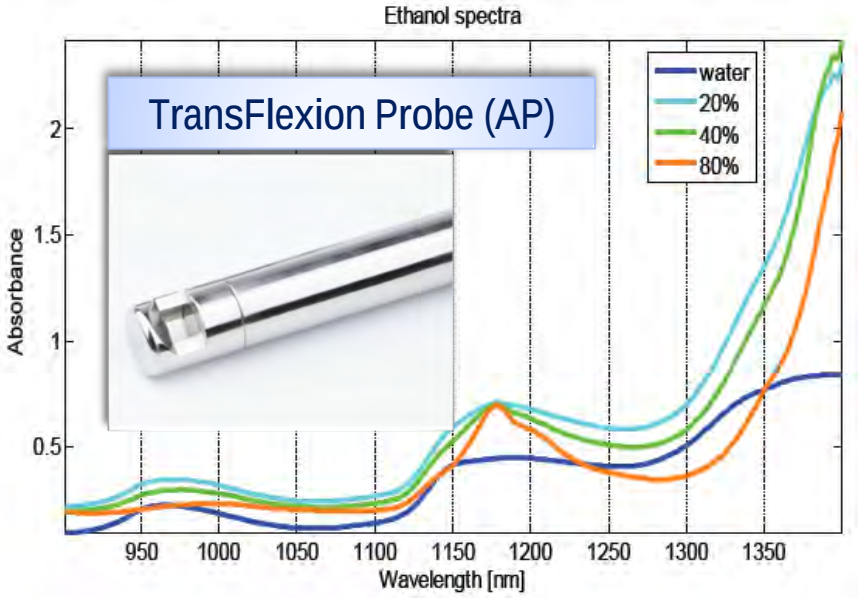
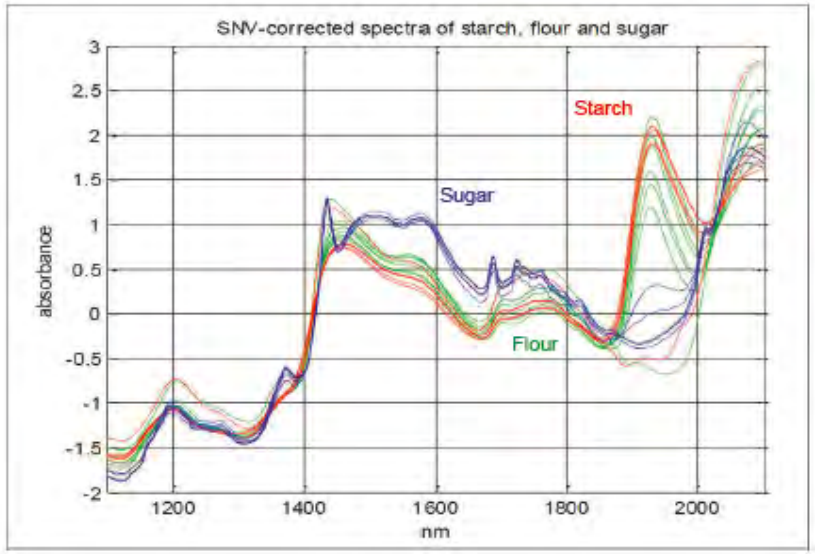
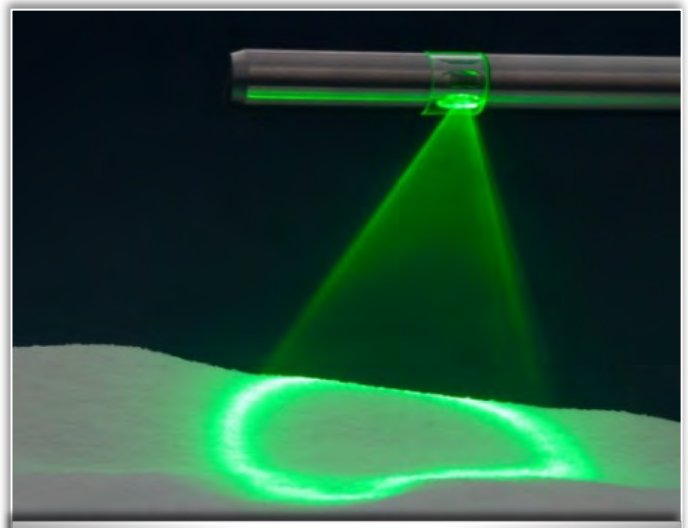
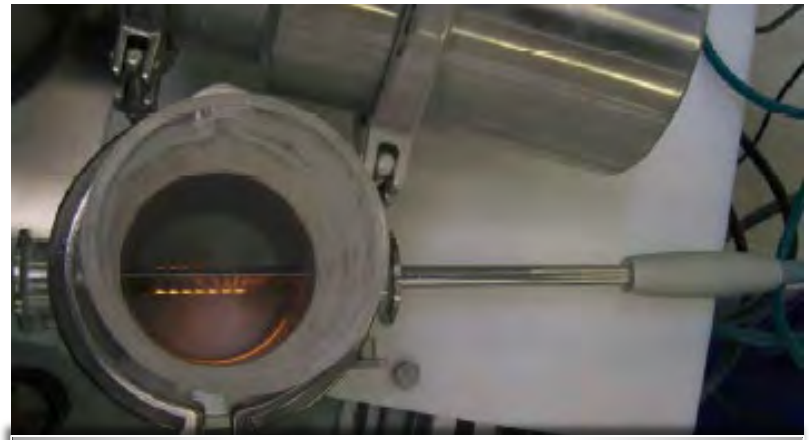






Fish-eye DRS-Probe
with 2 side windows (AP)



Side-line DRS-probe with 7 side windows (Sentronic)

Spectral Fiber Moisture Sensor using IoT Concept

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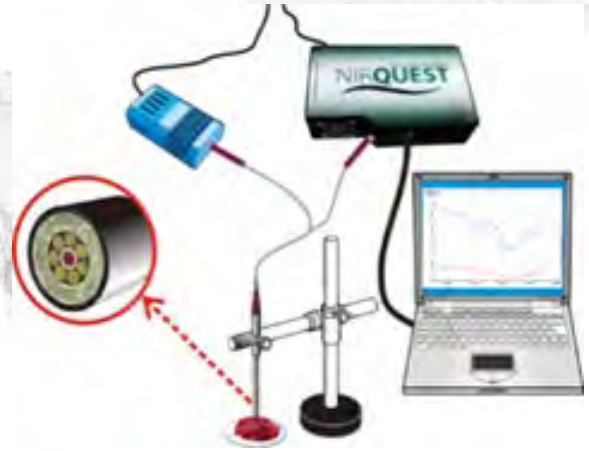
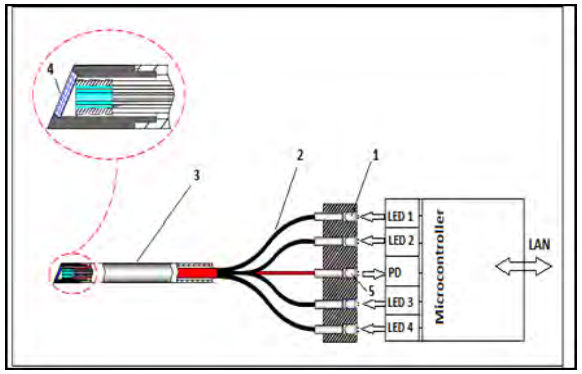
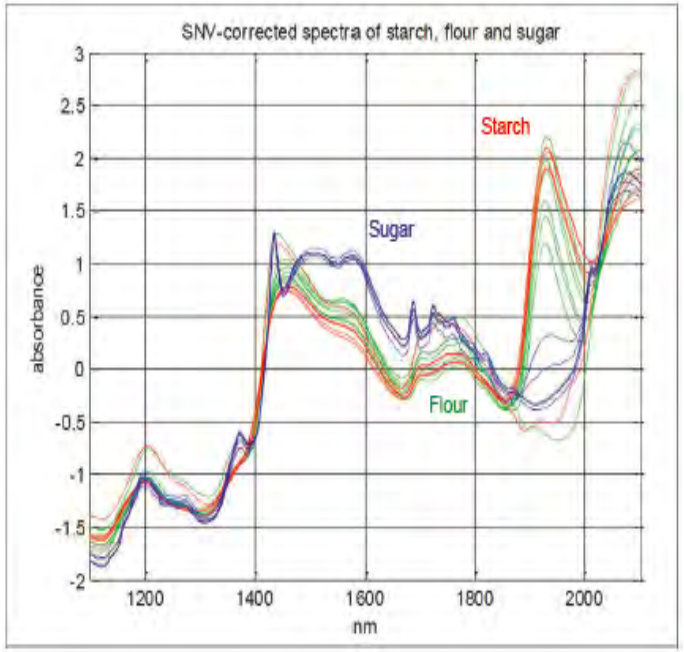
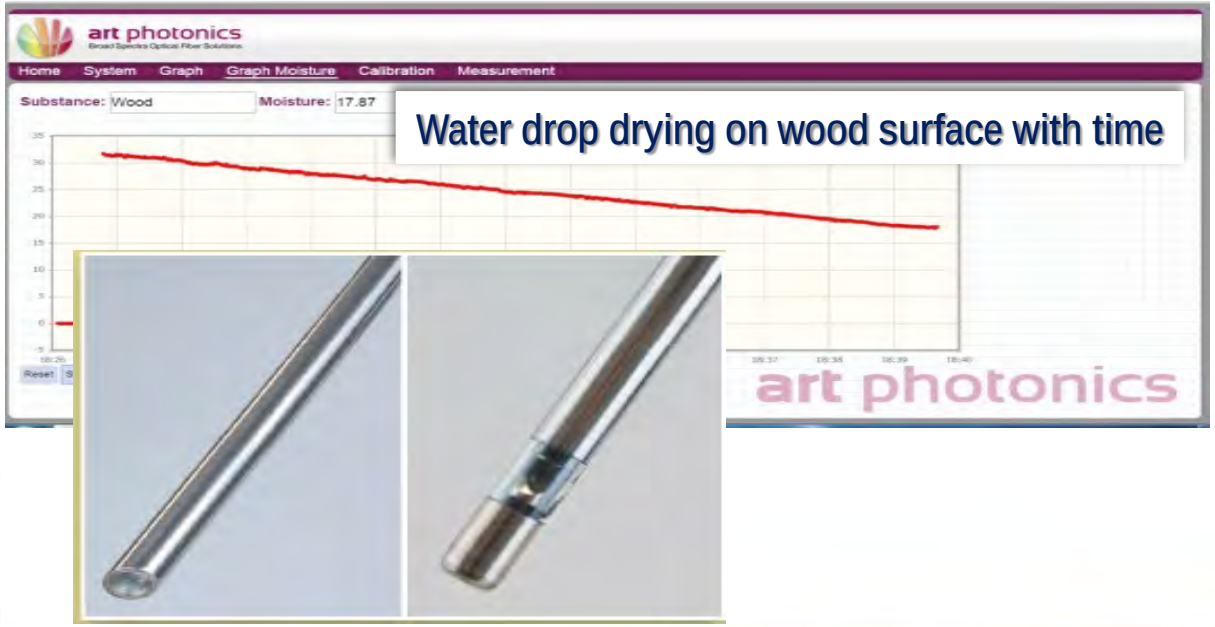
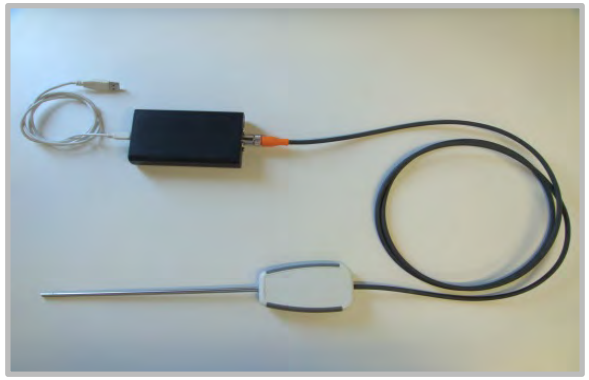


Fiber Moisture Sensor can be based on 4 NIR-LED only + one photodiode (instead of expensive NIR-Spectrometer) with the proper wavelength selection – to enable the fast control of moisture (1s) with 0,1% accuracy in various white powders. Variety of fiber probes enables to measure diffuse reflection or transmission signals for different media at 4 wavelengths, while software of microprocessor calculates moisture level and send the data to iCloud by (W)LAN









Multi-spectral Analysis of Milk Products

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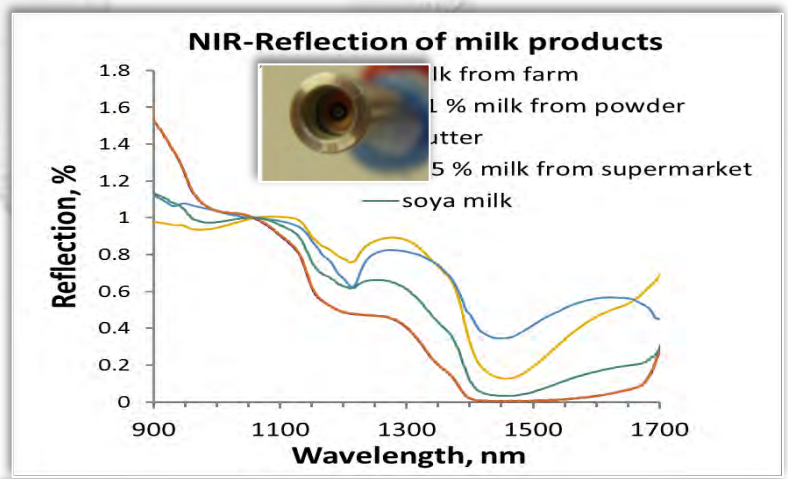
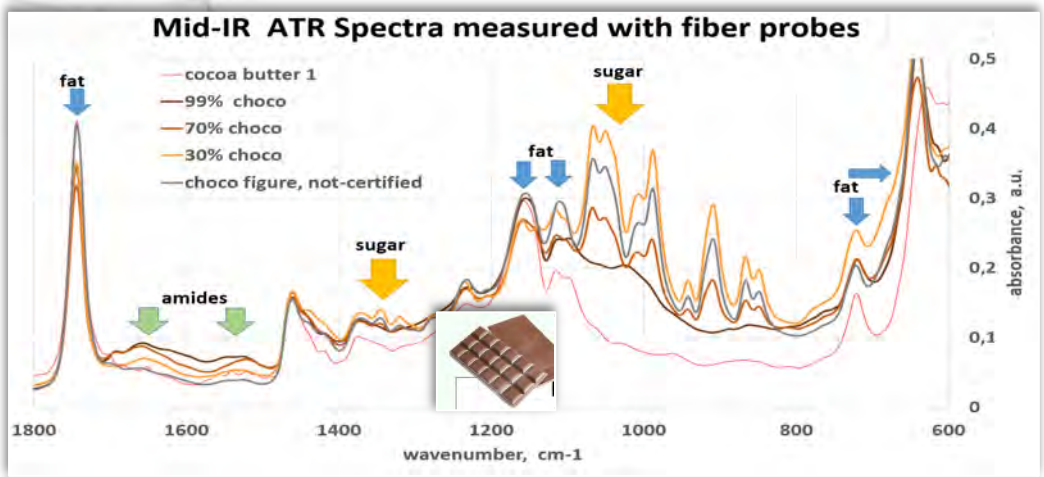
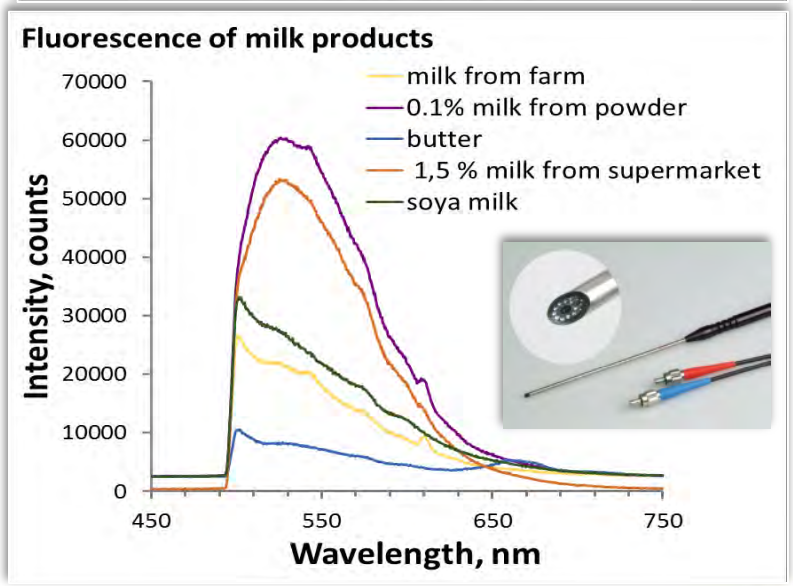
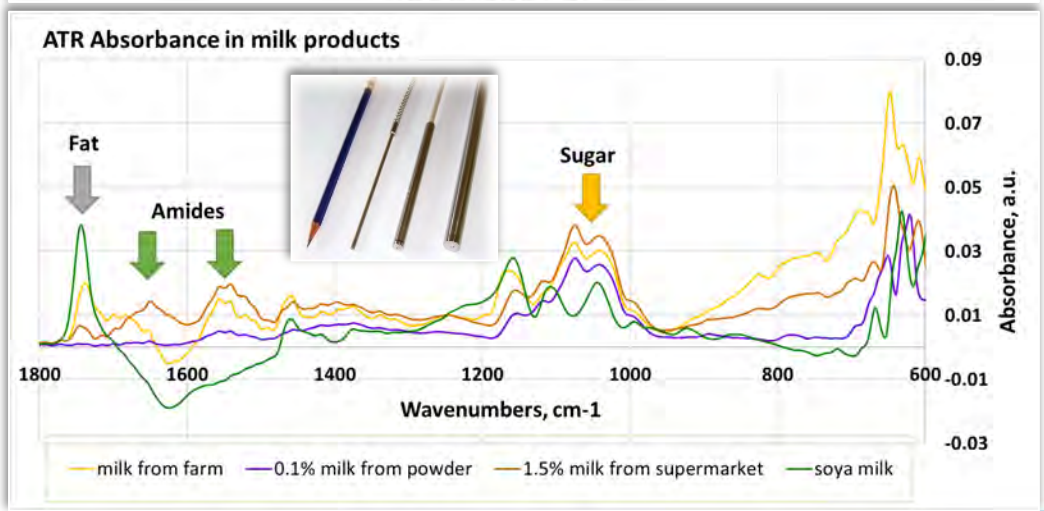
Different spectroscopy methods provides complimentary information in real time on milk products composition & quality (and chocolate!)









Gas Sensing with IR-Fiber or HWG-coupled Quantum Cascade Lasers

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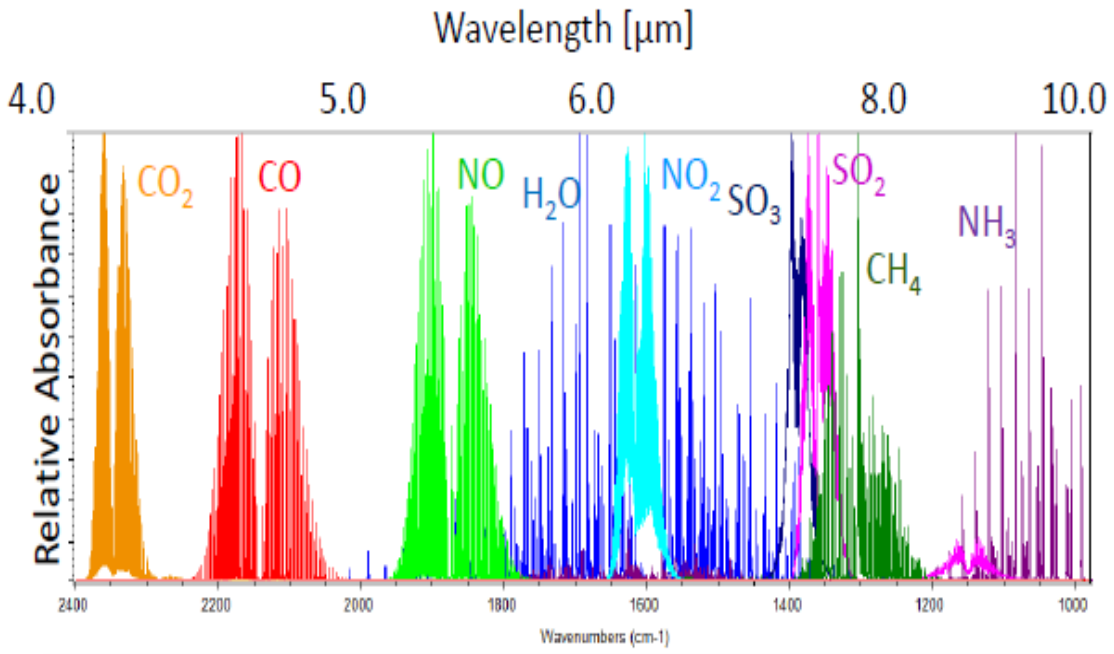
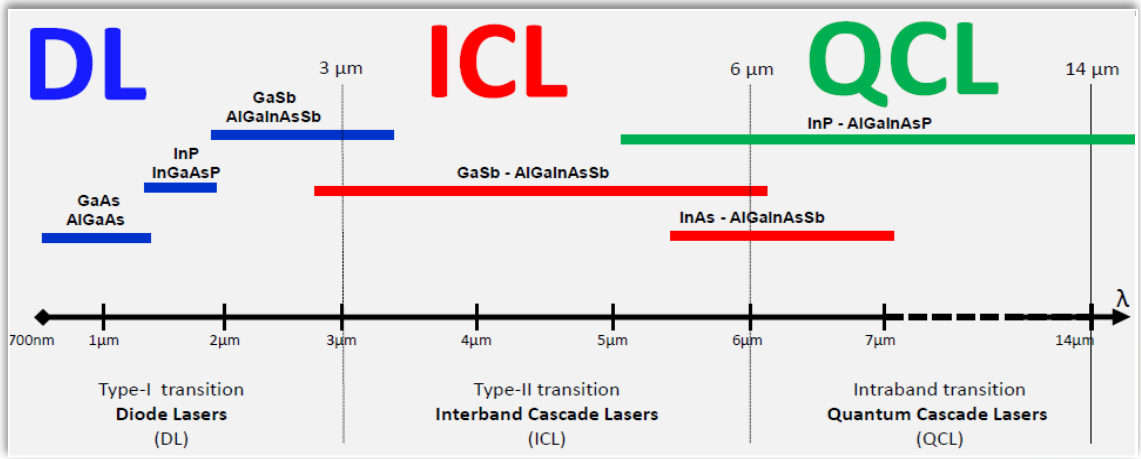


Opto Precision

PIR-fiber bundle enable to combine radiation from 7 QC-Lasers in one PIR-fiber Probe (see EU MIRACLE-project at www.miracleproject.eu)

MIRACLE
miracleproject.eu

Nanosystems and Technologies GmbH
nanoplus



Spectral Fiber Sensors – Way to the IoT Future!

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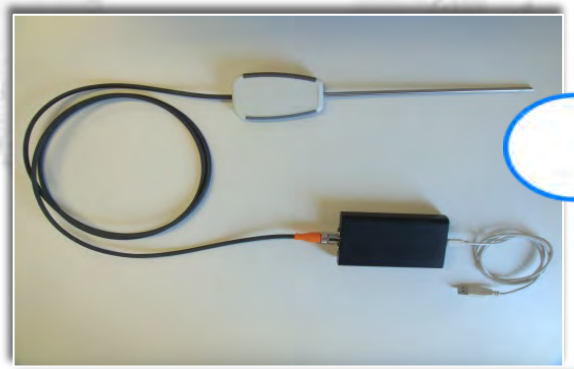
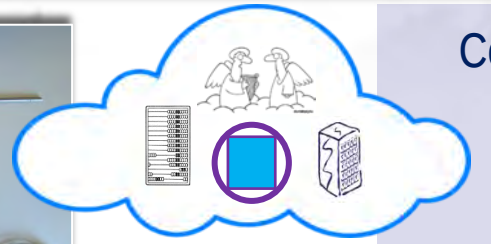
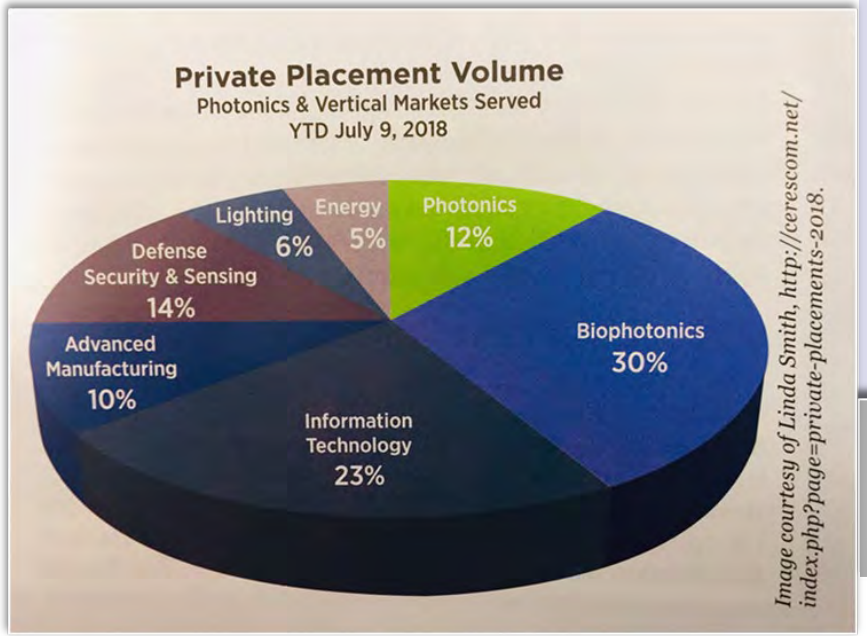
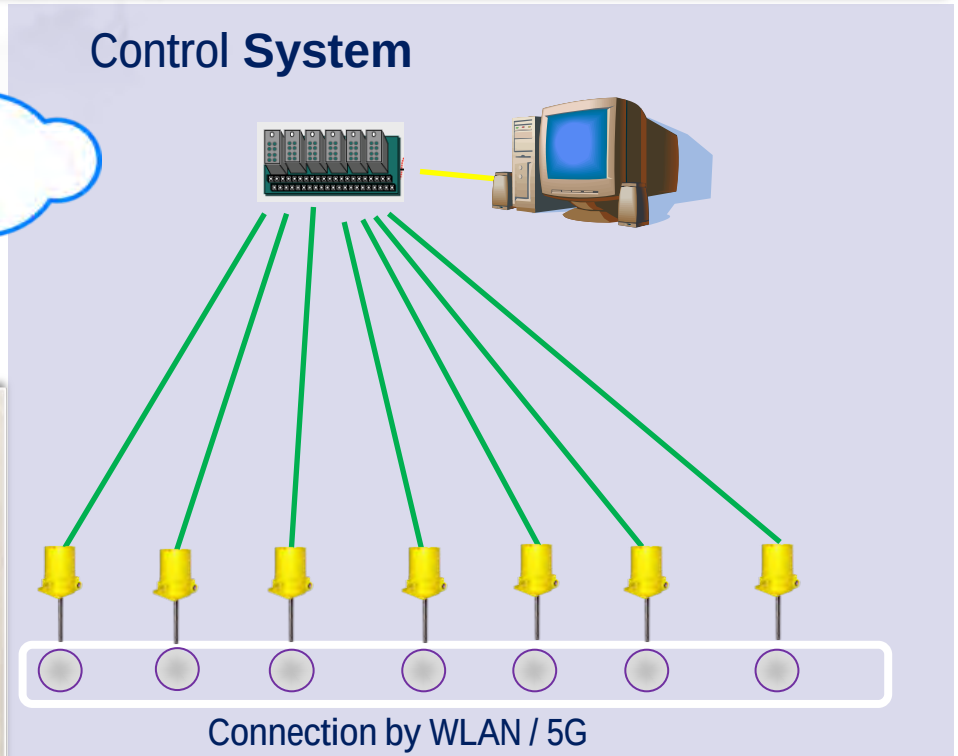
The global market for IoT networking solutions will grow from $392.1 billion in 2017 to $1.0 trillion by 2022 with an annual growth rate (CAGR) of 21.6% in 2017-2022









Fiber Sensors for Food & Beverage - for Industry & Consumers!

Welcome to our collaboration!

Please contact Slava Artyushenko at sa@artphotonics.com