

# Terahertz-DNA-Diagnostic

## The innovation

### Understanding the Challenge

In the DNA microarray market applications like in vitro diagnostics (IVD) or food monitoring are gaining increasing importance. Diseases, disease predispositions, pathogens as well as species origins or genetically modified organisms (GMO) are easily identified by DNA analytics.

Usually, DNA is labelled with fluorescent dye for subsequent detection. This labelling process implies several constraints regarding reliability, time and costs. Therefore, fundamental improvements in biosensor technology are necessary before diagnostic applications will continue their way towards broader applications.

### Presenting our Solution

The Terahertz technology (1 THz =  $10^{12}$  Hz) offers a unique solution to enable parallel microarray readout with unlabeled DNA circumventing the disadvantages of fluorescent systems and leading to a more robust method for DNA detection. In addition, the technology promises a higher sensitivity than competing label-free biosensor tools.

Due to the avoidance of bleaching artefacts measurement repeatability and long-term archiving of hybridized DNA bound onto biochips become feasible with the

THz technology. Moreover, the THz system is capable of distinguishing between blank and functionalized microarrays enabling an internal biochip quality control before loading the sample.

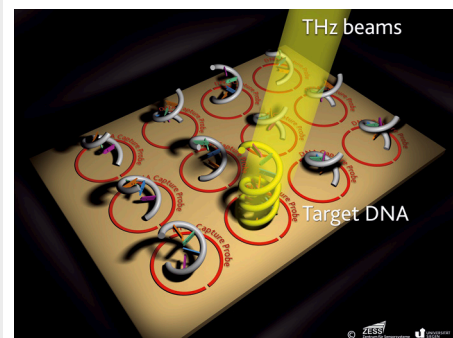
Our technological solution enables the THz emission by electronic means alone avoiding the common use of femtosecond-lasers. Therefore, the THz system can be constructed in a compact and cost-efficient way.

### Development Plan and Status

Within the closing development phase a THz DNA reader was realized as a compact demonstrator system with a non-laser-based THz source. Appropriate THz microarrays were developed and optimized for highest sensitivity. Together with industrial partners the completed detection system is evaluated in detail regarding its technical and economical potentials.

### Commercial Opportunity

We offer a DNA detection technology whose implementation is key to improve cost-efficiency of DNA detector systems for most of their applications, leading to market expansion into unexplored diagnostic markets (e. g. healthcare applications, diagnostics in biotech or widespread food monitoring).



## Advantages at a glance

- Label-free DNA detection
- Measurement repeatability and QC of DNA microarrays become feasible
- Time and cost savings through shorter processes, less equipment and fewer consumables
- Improved reliability due to omitting labelling errors and other critical parameters of fluorescence-based methods
- Compact and cost-efficient instrumentation
- High sensitivity

To acquire a licence for this new technology, please don't hesitate to contact us!

## Keywords

- Microarray
- In Vitro Diagnostic
- Label-Free DNA-Analysis
- DNA-Scanner
- Point of Care Diagnostic
- Food Monitoring
- GMO Detection

## Areas of application

- **Medicine: In vitro diagnostics**
- **Food processing industry: Proof of genetically altered food, harmful microorganisms, species origin**

## Patent status

The invention is filed internationally and partially granted. The patent portfolio is owned by Dritte Patentportfolio Beteiligungsgesellschaft mbH & Co. KG. The basic application was filed in July 2000.



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