

EIFFEL Early invasive fungal infection detection with Terahertz sensor systems

Due to medical advances in fields of transplant technology and cancer therapy these procedures now come on in daily clinical life. These interventions or therapies require the suppression of the patient's immune system. So the patient becomes susceptible to infections of any kind. At this point Invasive-Fungal-Infections (IFI) are a serious health problem. These infections are one of the most severe hospital infections with a high mortality rate. During the infection the mortality of such patients is 50 to 85%. Thus, there is a special interest to improve the treatment options. A crucial point in the fight against such infections is the early detection of the pathogens. This is essential to develop an effective treatment plan.

The EIFFEL-Project approaches this issue as part of the framework of the Euro-Trans-Bio cooperation program. In this project the skills of science and medicine are fitted together. So it is possible to operate effectively in the highest degree research. In the consortium facilities of health organizations, universities and companies are working together. The project group consists of five partners from Spain and Germany.

The main goal of the EIFFEL-Project is to develop a new fungi detection instrument based on terahertz technology. As key feature, this instrument will allow faster detection capabilities and higher sensitivity than conventional systems.

The task of the University of Siegen in this project is the development of a sensor chip for the fungi pathogen detection in the terahertz range. This chip is the interface between the biological and the electrical world. Its job is to amplify the interaction between probing field and the sample so that the overall system gets more sensitive. The whole evolution process from the first simulations over prototype manufacturing right up to the practical measurements in the lab are done at the institute for High Frequency and Quantum Electronics (HQE) which is led by Prof. Haring-Bolívar. He has over 15 years of experience in the field of terahertz research and is chair of his group at the university Siegen since 2004.

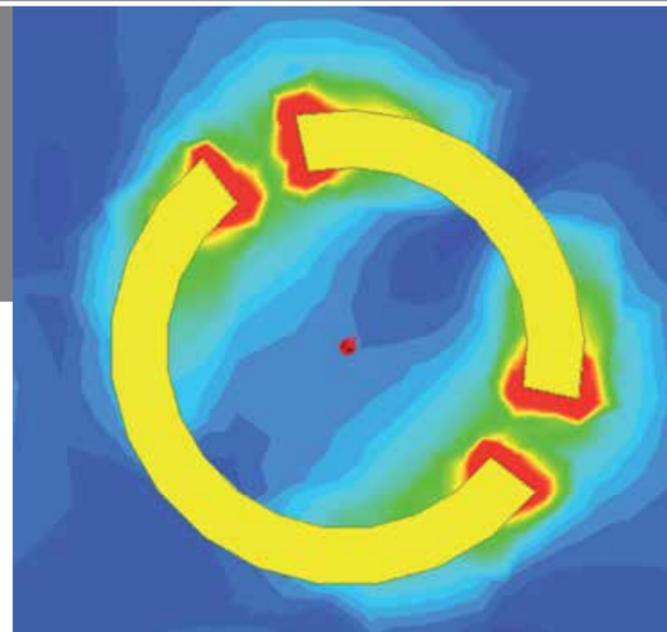


Fig. 1



Fig. 2

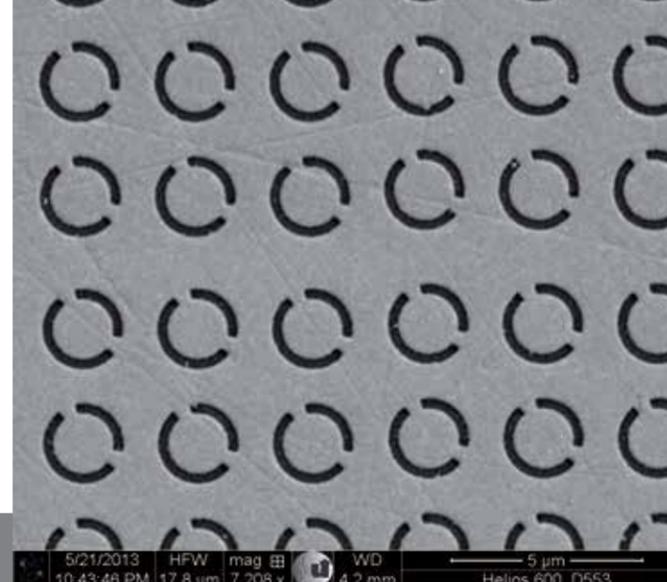


Fig. 1:
Simulation of the electrical field from one structure element of the sensor chip

Fig.2:
Structured surface of a sensor chip for very small probe quantities

I Project Management and Execution

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