



1 A Fraunhofer EMFT scientist with a Silicon Photomultiplier wafer

2 Wafer with Silicon Photomultipliers with areas of 1 mm² and 9 mm²

HIGHLY SENSITIVE RADIATION DETECTORS FOR MEDICAL APPLICATIONS

Introduction

Medical examination using Computer Tomography (CT) combined with Positron Emission Tomography (PET) involves high radioactive stress for the patients. In order to reduce this strain in the long term, the researchers at Fraunhofer EMFT are developing new systems for Magnet-Resonance-Tomography (MRT) combined with PET.

Description

Together with Ketek GmbH Fraunhofer EMFT has developed a so called Silicon Photomultiplier (SiPM) based on 200 nm technology. This shall replace the photomultiplier tubes in highly sensitive detector applications, for example in nuclear medicine technology (such as Positron Emission Tomography - PET), thus enabling the PET system to operate even in the strong magnetic field of a MRT.

Results

The SiPM developed at Fraunhofer EMFT show a good dark count rate compared with the other SiPM available on the market. As a result of transferring this technology to CMOS with smaller structure sizes they feature a good Photon Detection Efficiency (PDE), very low optical crosstalk as well as low temperature sensitivity at operating point. Insensitive to magnetic fields the SiPM are now suitable for the use in PET/MRT-systems. Ketek GmbH now produces and sells the SiPM resulting from the cooperation with Fraunhofer EMFT.

Note

The SiPM were implemented as a part of the project HESDEK (Highly Sensitive Radiation Detectors), funded by the Bavarian State Ministry for economy, infrastructure, traffic and technology within the frame program for information and communication technology.

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