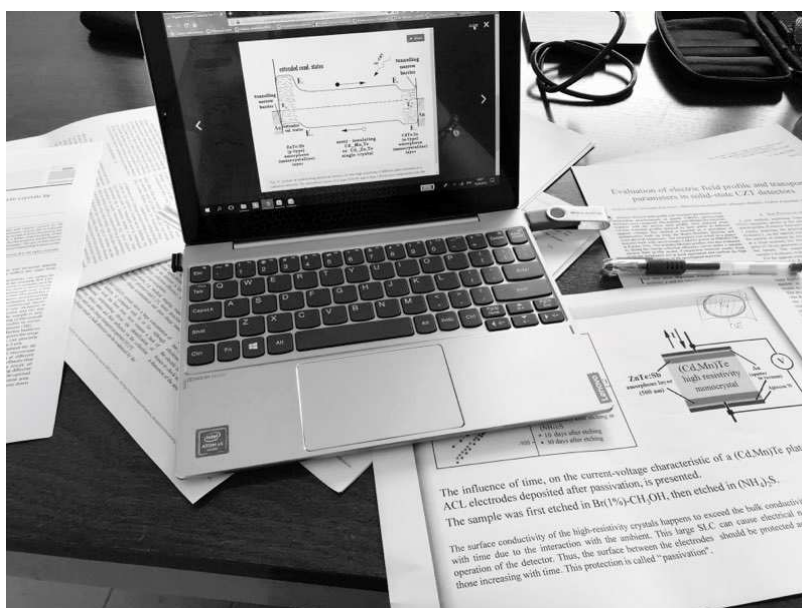


**Dominika Kochanowska & Marta Witkowska-Baran**  
**@ IMEM -CNR and Institute of Materials for Electronics and Magnetism,**  
**University of Parma, Italy**

In our research, we are occupied with the growth and characterisation of the semi-insulating CdTe based crystals for X- and gamma radiation detectors.

One of the important parts of these studies is investigating the type, size and density of defects in this material. Such observations could be obtained in collaboration with prof. Andrea Zappettini from IMEM -CNR and Institute of Materials for Electronics and Magnetism in Parma. The aim of our mobility was to learn how to use an infrared microscope for our measurements. The microscope at Parma group is equipped with a 3D system, which allows for tellurium inclusion mapping and can make 3D pictures of the tellurium distribution in a sample.

One of the CdTe- based material properties is the presence of inclusions in the crystal matrix, mainly due to tellurium excess. It is important to set up characterisation methods, which allow for the observation of the shape and diameter of such defects in 3D maps. This is a key point for a better understanding of the inclusion-formation mechanism and for the evaluation of crystal quality. For this purpose, prof. Andrea Zappettini group developed the system that can be implemented on a standard infrared transmission optical microscopes. The use of this tool in the characterisation of Bridgman grown CdTe, CdZnTe and CdMnTe samples uncovers interesting features of the tellurium inclusion distribution.



During mobility time we participated in the measurements of the samples, in the 3D IR microscopy system. We also took part in process of analysis of the experimental results and participated in a discussion of those results. During our visit, we were also asked for a presentation of our scientific work.

Expected outcomes and impact: knowledge allowing the reduction of defects and thereby increasing the resistivity of the material for construction of X and gamma-ray detectors.

Continuation of the scientific contacts between IP PAS, and Institute of Materials for Electronics and Magnetism, University of Parma could bring a future exchange of crystals, the experimental data, and their interpretation.

The main value of the mobility was the exchange of knowledge and experience in the area 3D IR microscopy system for tellurium inclusion mapping measurement.