SEMINARIUM RENTGENOWSKIE

Dnia 12.04.2016r. o godz. 10.30 w sali D Instytutu Fizyki PAN, odbędzie się seminarium, na którym **Dr. Jürgen Härtwig** (ESRF, Grenoble, France) wygłosi referat, przygotowany w ramach projektu EAgLE, pt.:

"The X-ray optics group of the ESRF and the test and use of X-ray optical elements,diamond based electronics, and the construction of a crystal undulator"

Streszczenie:

In the first part of this seminar some information about the X-ray optics group of the ESRF, its laboratories, and its experimental station at the instrumentation beamline BM05 will be presented. This includes a very short repetition to explain, what X-ray optics at modern synchrotron light sources is.

This will be followed by giving some examples of our instrumental possibilities and needs to measure the surface- and the bulk quality of X-ray optical elements like mirrors, multilayers or crystal monochromators and analysers. Those test methods are crucial for checking the quality of the X-ray optical elements but also the materials used for their manufacturing. To give an example - high quality monocrystals like silicon, germanium or diamond are important materials for a number of X-ray optical elements. For applications like monochromators the bulk, surface and subsurface quality are crucial.

Our special interest is directed on high structural quality (nearly free of extended defects lice dislocations, stacking faults or inclusions) single crystal diamond. This material has many attractive physical properties, in particular its extreme thermal conductivity, charge mobility, wide band gap and high breakdown electric field strength. We participate and work in several co-operations and projects in the fields of the use of diamond in electronics, detectors, and X-ray optics. High voltage diodes fabricated with boron doped diamond are proven and various FET devices are now being developed to commute high power at high frequency to minimize losses in power distribution networks. High lattice quality (111) oriented diamond plates are needed at synchrotron light sources for beam splitters monochromators, phase plates and monochromators. The undulator devices currently used at synchrotrons to produce extremely brilliant X-ray beams are massive structures, several meters in length, required to produce spatially alternating magnetic fields. It has been shown (theoretically!) that a far more compact undulator can be produced using a diamond crystal plate which has a set of boron doped layers with varying boron concentration on the top to create a tailored strain pattern in this crystal multilayer lattice. Such undulator crystals can theoretically lead to the generation of intense monochromatic radiation in the gamma region of the energy spectrum.

Prof. dr hab. Wojciech Paszkowicz

Prof. dr hab. Krystyna Jabłońska