# Röntgenpreis for X-Ray research goes to Christian David

**In a ceremony held at the University of Giessen (Germany) on 26th November 2010, Christian David, scientist at the Laboratory for Micro and Nanotechnology of the Paul Scherrer Institute, received the Röntgenpreis for research in radiation science. David pioneered a method to enhance the quality of X-ray images. He developed an x-ray interferometer that allows one to visualize the phase shift and the scattering power of an object in addition to the conventional absorption based radiographs. The interferometer is based on a set of diffraction gratings with micrometer-sized slits developed and manufactured in David's group at the Laboratory for Micro and Nanotechnology. Christian David received the award jointly with Franz Pfeiffer from Technische Universität München who worked closely together with him.**

Normal X-ray images are based on absorption contrast – they show the shadow of the inner structure of the object investigated. Thus, materials with different absorption coefficients – such as bones and soft tissue in a medical image – can be easily distinguished in an X-ray. Materials with similar values of the absorption coefficient, however, look almost the same. In medical applications this may be problematic e.g. when a tumour has to be distinguished from the surrounding healthy tissue.

## Award for high quality x-ray images

Several methods for enhancing the quality of microscopic images in light microscopy have been used for decades – among them phase contrast microscopy, employing the differences in phase shifts accumulated by the beam at different points of the sample and dark field microscopy based on the observation of the scattered part of the beam – instead of the transmitted one. This year's 2010 Röntgenpreis of the University of Giessen is awarded to Christian David from the PSI and Franz Pfeiffer from the Technische Universität München for applying these methods to x-ray imaging techniques by using a grating interferometry technique.

Already in 2001, Christian David started to perform experiments on synchrotron beam lines to record the phase shift in x-ray images using two microfabricated diffraction gratings. Some years later, he discovered together with Franz Pfeiffer that the method can also be used on standard x-ray tubes when a third diffraction grating is introduced. This key development distinguishes the method from other x-ray phase contrast imaging methods, as it allows for widespread applications outside the large scale research facilities. In addition, the scientists showed that the setup is also capable of providing a dark field image of the sample giving information on the local scattering power of a sample. The discoveries of the laureates are expected to have significant impact in medical imaging, but also in non-destructive testing of industrial products or even in luggage security checks.

## The laureates

Christian David, born in 1965, is Head of the Group X-ray Optics and Applications at the Laboratory for Micro- and Nanotechnology of the Paul Scherrer Institute. David studied Physics at the University of Göttingen. After a postdoctoral stay at the University of Heidelberg, he started working at PSI in 1996. He was awarded the Röntgenpreis together with his colleague Franz Pfeiffer, born in 1972, former scientist at PSI and now Professor of Physics at the Technische Universität München.