dynamic range, noise etc. Different detector technologies are available including an amorphous silicon flat panel, a 11 Megapixel CCD camera, CMOS flat panel detectors and an image intensifier. All this results in a wide range of experimental conditions (10-160 kV, sample size from sub-mm up to 20 cm, spatial resolutions from 1 mm down to 1 micrometer). Some applications are: species description of fossil inclusions in amber, statistical analysis of pore size distributions in rocks and soils, providing 3D CAD models of objects for input into finite element tools for simulation of stress or fluid flow, structural analysis of foams etc.

This talk will give a detailed description of the setup, an overview of some typical applications and the available hard- and software-tools. Finally we will describe the potential of future detector technologies in micro-CT applications.

Contributed Talk 4.2 Mon 14:40 Lecture Hall
The LHCb RICH photon detector system — •Kenneth Wyllie — CERN, Geneva 23, Switzerland CH-1211

The LHCb experiment at the CERN Large Hadron Collider will employ two Ring-Imaging-Cherenkov (RICH) detectors for particle identification. The Cherenkov photons will be detected by planes of photon detectors covering a total surface area of 2.6m2. The detector chosen for this task is the pixel hybrid photon detector (HPD). This novel device combines silicon sensors, integrated pixel front-end electronics and high-density interconnects together with vacuum-tube technology to produce an efficient, low-noise detector sensitive to single photons. For the complete photon detector system of the LHCb RICH, 484 such HPDs are required.

This paper describes the HPD system installed in the LHCb RICH experiment. The HPD technology was presented at IWORID 2004 and production was subsequently started on all components for the full complement of 484 HPDs. The difficulties experienced during production and their solutions will be described, with specific emphasis on the integrated silicon sensors and readout electronics. The incorporation of the HPDs within the system will then be presented together with particular aspects of this integration related to the efficiency and lifetime of the detector in the harsh environment of LHCb. Finally, results from tests of the system using a number of different photon sources will be presented.

Contributed Talk 4.3 Mon 15:00 Lecture Hall
High resolution application of YAG:Ce and LuAG:Ce imaging detectors with CCD X-ray camera — •Jan Tous[1], Martin Horvath[2], Ladislav Pina[2], and Karel Blazek[1] — [1]Crytur Ltd., Palackeho 175, CZ-51101, Turnov, Czech Republic — [2]Reflex Ltd., Novodvorska 994, CZ-14221, Prague, Czech Republic

A high resolution CCD X-rays camera based on YAG:Ce or LuAG:Ce thin scintillators is presented. The high resolution of the imaging system in low energy X-ray radiation is proved on several objects. The achieved spatial resolution of the images is better than 1 micron.

The high resolution imaging system is a combination of a high sensitive digital CCD camera and an optical system with a thin scintillator imaging screen. The screen is the YAG:Ce or LuAG:Ce inorganic scintillator. These materials have the advantages in the mechanical and chemical stability and the non-hygroscopicity. The high-resolution imaging system can be used for different types of radiation (X-Ray, electron, UV, and VUV). The objects used for imaging are grids and small animals with parts of several microns in dimension. The resolution capabilities have been tested using different types of CCD cameras and scintillation imaging screens.

Contributed Talk 4.4 Mon 15:20 Lecture Hall
Characterisation of lanthanides-doped LSO epitaxial layers for high-resolution X-ray imaging applications — •Paul-Antoine Douissard[1], Thierry Martin[1], Maurice Couchaud[2], Alexander Rack[3], Angelica Cecilia[3], and Tilo Baumbach[3] — [1]European Synchrotron Radiation Facility, BP 220, Grenoble, 38043, France — [2]CEA Léti MINATEC, 17 rue des Martyrs, Grenoble, 38054, France — [3]Forschungszentrum Karlsruhe ANKA, Postfach 3640, Karlsruhe, 76021, Germany

The SCINTAX projects aims at developing a new thin layer scintillator for high resolution X-ray imaging. Based on LSO layers grown on adapted substrates, these scintillators will radically improve the efficiency of X-ray imaging methods currently used in synchrotron facilities. It also presents interesting features for the non destructive testing market. The major improvement will result from a higher absorption of these crystals with respect to commonly used scintillators, such as YAG:Ce, LAG:Eu, GGG:Eu etc. Another advantage is that the substrate used for the growth presents no emission under X-ray excitation. It is not the case for most substrates used today in synchrotron x-ray imaging [1]. Finally, the emission can be adapted to better match the CCD cameras quantum efficiency by using a right dopant [2].

LSO thin scintillating layers doped with different lanthanides ions were grown using Liquid Phase Epitaxy (LPE) at the French Atomic Energy Commission (CEA). Their scintillating characteristics were then studied: light output, UV/Vis absorption, X-ray absorption efficiency, radiation damage, afterglow, decay time. The line spread function (LSF) was also measured under X-ray radiations from the European Synchrotron Radiation Facility (ESRF). These performances were then compared to thin film scintillators commonly used in synchrotron applications.

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Contributed Talk 4.5 Mon 15:40 Lecture Hall
Microcolumnar ZnSe:Te Scintillator for High Resolution Imaging — •Vivek Nagarkar, Bipin Singh, Valeriy Gaysinskiy, Stuart Miller, and Samta Thacker — Radiation Monitoring Devices, Inc., 44 Hunt Street, Watertown, MA 02472

The advent of large area high-resolution digital readouts has revolutionized digital X-ray imaging technology enabling their use in such important applications as medical imaging, nondestructive testing, and homeland security. Recent outstanding progress in high-speed sensors such as an electron multiplying CCD (EMCCD), has now made it possible to design imaging detectors for several new and exciting applications including time resolved studies and high speed cone beam computed tomography (CBCT) for basic biological and functional studies. Since most current and anticipated future digital detectors rely on indirect detection of X-rays where scintillators act as a light converter, correspondingly brisk progress in high resolution, high light yield, fast scintil-