XTOP 2006

Scope
XTOP will bring together experts in the fields of X-ray diffractometry, X-ray diffraction imaging / topography, and X-ray phase contrast imaging (radiography and micro-tomography). XTOP is one of the central scientific platforms concerning methods and instrumentation in synchrotron-based high-resolution X-ray diffraction methods, phase contrast imaging, and microtomography.

Immediately preceding the conference, on 18-19 September, a tutorial session comprising extended presentations by renowned international specialists for X-ray diffraction and X-ray imaging techniques will be dedicated to summarizing the present status of the entire field. The focus here is on giving comprehensive introductions to different topics.

Venue
The conference will be hosted by Steigenberger Hotel Badischer Hof, Baden-Baden. The extended programme will include a visit to the synchrotron ANKA at Forschungszentrum Karlsruhe.

Subject Areas

- X-ray scattering
  - Grazing-Incidence Small-Angle Scattering (GISAXS)
  - High-resolution diffraction
  - X-ray reflection
  - Reciprocal space mapping
  - Anomalous scattering
  - Coherent scattering

- X-ray imaging
  - X-ray topography
  - Microdiffraction imaging
Microtomography
  ● Phase contrast imaging
  ● In-situ characterization during growth and processing
  ● X-ray optics & instrumentation

Previous XTOPs Conferences
  ● 1992: Marseille (F)
  ● 1994: Berlin (D)
  ● 1996: Erice (I)
  ● 1998: Durham (GB)
  ● 2000: Ustron-Jaszowiec (Poland)
  ● 2002: Aussois (F)
  ● 2004: Prague (CZ)

Organized by

Forschungszentrum Karlsruhe
in der Helmholtz-Gemeinschaft

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SPECULAR BEAM SUPPRESSION IN CASE OF GRAZING-ANGLE INCIDENCE X-RAY BACKSCATTERING DIFFRACTION BY THE SINGLE CRYSTAL WAFER COVERED WITH A THIN NON-DIFFRACTING LAYER

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Forthcoming nanostructured devices with the increasing storage capacities of the surface storage digital information carriers (2-D storage) require a readout system operating on an angstrom wavelength radiation i.e. on the x-ray wavelength. Data storage media particularly are produced on the base of the semiconductor nanostructured crystalline materials. Such semiconductor nanostructured devices e.g. could operate using the grazing-angle incidence x-ray backscattering diffraction (GIXB) technique [1, 2], which takes place in the conditions of specular vacuum wave suppression phenomenon since in the conditions of the reflected wave suppression mode the specular wave (contrary to other existing X-ray diffraction methods) practically carries the information only about the non-diffracting subsurface reflectors [3]. The GIXB is a high-resolution and non-destructive technique, which is possible to realize only if the Bragg angle is close to 90°. The GIXB configuration first was considered in 1985 (see the English version [1, 2] of origin papers, which concern the GIXB by single crystals and very thin crystalline films).

A digital information carrier destined for the ultrahigh-density data storage readout systems based on x-ray diffraction optics is considered in papers [3, 4]. Digital data reading procedure from the proposed ultrahigh-density x-ray optical data storage media named X-ROM is performed via grazing-angle incident x-ray micro beam. X-ROM system detects data by measuring the changes in x-ray micro beam intensity reflected from the various surface points of data storage media. Grazing-angle incident x-ray configuration allows the simultaneous data readout from large area of the X-ROM. Note that the positions of the ultrahigh-density digital information carrier and of the grazing-angle incident x-ray micro beam are fixed, unlike the conventional optical data readout systems.

One can protect data storage media by covering it with a thin polymer layer or another non-diffracting material. Additional investigations are necessary to be aware that the data readout technique proposed in [3, 4] also could be applicable in this case. So, we consider in presented theoretical paper a specular beam suppression phenomenon in the case of GIXB by the single crystal wafer covered with a thin non-diffracting layer.


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