AXRO 2018
BOOK OF ABSTRACTS

Contents

QPOs of black holes explained by frequency resonances of epicyclic motions in the accretion disk

Bernd Aschenbach

Over more than 15 years QPOs, both twin QPOs but also single QPOs, have been observed at high and low frequencies. The associated black holes have masses ranging from stellar size to supermassive galactic nuclei. This group, despite the large range of masses, is fairly small in number. I suggest that this distinctiveness is the result of a common parameter and this is the maximum spin a black hole can manage.

VZLUSAT-1: A Year of Space Radiation Monitoring on the First Czech CubeSat

Tomáš Báča

The VZLUSAT-1 satellite, the first Czech CubeSat, was successfully launched on June 23, 2017, to a 510 km Sun-synchronous low-Earth orbit. It carries several scientific payloads including a Timepix detector as focal plane imager for the X-Ray telescope on board. The Timepix detector contributes significantly to the satellite data collection, with more than 25 000 sampling acquisitions in the first year of deployment. Despite limitations of the satellite attitude control system, necessary for capturing X-Ray images of the Sun, the Timepix detector allows measuring the space radiation environment along the

satellite orbit. As of September 2018, we conducted 33 whole-Earth mappings, recording radiation doses around the planet. Further, we show data from scans of the South Atlantic Anomaly and polar radiation horns. Since October 2017, the optics segment of the onboard X-Ray telescope was deployed, which exposed the Timepix detector unshielded to free open space. This change produced entirely new observations namely of low energy charged particles and a significant increase of measured particle flux. We will summarize the data collected during the first year of the satellite operation and present unique maps of radiation at the satellite orbit, which were reconstructed using novel machine learning methods.

AHEAD: the Project and its Joint Research Activity on X-ray optics

Vadim Burwitz

An overview of the european unions H2020 AHEAD project will be given. Followed by an overview of the work done within the AHEAD joint research activity on X-ray optics in conjunction with PANTER X-ray test facility on the characterisation and simulation of different X-ray optics technologies. Also the positive impact of AHEAD on the development of the BEaTRiX test facility for testing silicon pore optic will be discussed.

Results from the use of the X-ray reverberation model KYNREFREV: exploring new coronal geometries

Maria D. Caballero-Garcia

X-ray reverberation in Active Galactic Nuclei, believed to be the result of the reprocessing of corona photons by the underlying accretion disc, has allowed us to probe the properties of the inner-most regions of the accretion flow and the central black hole. Our current model (KYNREFREV) computes the time-dependent reflection spectra of the disc as a response to a flash of primary power-law radiation from a point source corona located on the axis of the black hole accretion disc (lamp-post geometry). Full relativistic effects are taken into account. The ionization of the disc is set for each radius according to the amount of the incident primary flux and the density of the accretion disc. We detect wavy residuals around the best-fit reverberation model time lags at high frequencies. This result suggests that the simple lamp-post geometry does not fully explain the X-ray source/disc configuration in Active Galactic Nuclei. Whilst there has been some progress into the field (Wilkins+16, Chainakun+17, Taylor+18a,b) only the model from Chainakun+17, consisting of two axial point sources illuminating an accretion disc that produce the reverberation lags is able to produce the observed time-lag versus frequency spectra. The goal of our current work is to observationally justify and provide with mathematical formulation of a model for an extended corona in its simplest form.

Characterization of an X-ray Lobster Optic with a Hybrid CMOS detector

Tanmoy Chattopadhyay

X-ray lobster optics provide a unique way to focus X-rays onto a small focal plane imager with wide field of view imaging. With angular resolution of a few arcminutes, such an instrument can be used to study GRB afterglows, transients, and the variability and spectroscopic characteristics of myriad other astrophysical objects. At Penn State University, we are characterizing a lobster optic with an H1RG X-Ray hybrid CMOS detector (100 μm thick Silicon with 18 μm pixel size). The light-weight compact lobster optic with a 25 cm focal length and 5 cm x 5 cm aperture provides two dimensional imaging with significant reflection efficiency in soft X-rays. We utilize a 47 meter long X-ray beam line at Penn State University to do our experiments, where we characterize the overall effective area of the instrument at 1.2 – 6.4 keV for both on-axis and off-axis angles (0 – 2 deg). In this presentation, the characterization test stand and methods will be described, along with the test results from these measurements. We will also discuss the use of this lobster-HCD system as a wide field imager for future CubeSat missions that offer the potential for a high science-to-cost ratio.

Film stress compensation and mirror mounting stress relief

Brandon Chalifoux

The Lynx X-ray Observatory mission concept will require a telescope with high resolution (∼0.5 arc-sec HPD) and a large effective area (> 2 sq. meters). One path to achieving this is to use thin segmented mirrors assembled into a telescope mirror assembly. One of the major challenges with using segmented mirrors is that film stress, intrinsic to a reflective film such as iridium, deforms mirrors well beyond what would be required for Lynx. This stress may be non-uniform and non-repeatable. The Space Nanotechnology Lab at MIT has developed a number of approaches that may be useful for solving the film stress problem, by applying an equal stress distribution to the back side. These methods, which have been developed for glass and silicon, include film patterning, ion implantation, and ultrafast laser micro-stressing. We will review the operating principle of these approaches, and highlight recent developments in each technique. We will also share recent work on developing a method to relieve stress at mounting points on mirrors.

Progress of Follow-up X-ray Telescope onboard Einstein Probe mission

Yong Chen

Full shells for Lynx Mirror Assembly

Marta Civitani

REX LE X-ray Telescope experiment overview

Vladimír Dániel

The presentation will summarize the Rocket EXperiment (REX) LE X-ray Telescope payload results. The experiment was performed by the PennState University with X-ray spectroscope on board a Water Recovery X-Ray Rocket (WRXR) launched on 4th April, 2018. The secondary payload was the REX LE X-ray Telescope. The REX LE X-ray telescope consists of two X-ray telescopes with 1D and 2D optics, a single visible-light camera and an IR grid-eye. The primary structure consists of a metal housing for the optics and a carbon fiber baffle with the Timepix sensors mounted at the end. The observation data from the experiment will be presented.

Methods of coating stress compensation for iridium based X-ray mirrors

Thorsten Döhring

Iridium-based coatings for mirrors of spaceborn X-ray telescopes were studied in a cooperation between Aschaffenburg University (Germany) and the Institut Fresnel in Marseille (France). In particular, the stress induced deformation of thin glass substrates by magnetron sputtered iridium layers has been characterized and shown to be compressive and equal to about -1786 MPa. Two methods for stress compensation are then studied. One relies on the deposition of silica on the back surface of the substrate and a second one relies on the deposition of a chromium sublayer with adapted thickness. Advantages and drawbacks of each of these techniques are presented and discussed.

Performance testing of X-ray reflection grating prototypes for the Off-plane Grating Rocket Experiment

Benjamin Donovan

The soft X-ray spectrometer payload onboard the Off-plane Grating Rocket Experiment (OGRE) hopes to achieve the highest resolution soft X-ray spectrum of an astrophysical object when it is launched via suborbital rocket. Paramount to the success of the spectrometer are the performance of its >200 reflection gratings populating its reflection grating array. Two prototype gratings for the payload were manufactured using different electron-beam lithography techniques and were evaluated for performance at the PANTER X-ray Test Facility. Results from the test campaign and implications of these results as they relate to OGRE will be discussed.

Ultra light-weight X-ray telescopes for future Japanese missions

Yuichiro Ezoe

Toward a new era of X-ray astronomy, next generation X-ray optics are indispensable. To meet a demand for telescopes lighter than the foil optics but with a better angular resolution less than 1 arcmin, we are developing micropore X-ray optics based on micromaching technologies. Using hot plastic deformation of silicon wafers, we are also developing mirrors for telescopes as light as foil optics but with better resolution. In this talk, I will review our development.

The high energy gamma-ray mission concept ASTENA

Filippo Frontera

Within the context of the European project AHEAD, a new concept of high energy mission named ASTENA (Advanced Surveyor of Transient Events and Nuclear Astrophysics) is being performed. The mission includes a large array of broad band (1-20 MeV) Wide Field Monitors with imaging and spectroscopy capabilities (WFM-IS), and a large effective area broad-band (50-700 keV) Narrow Field Telescope (NFT) with focusing capabilities based on the use of an advanced Laue lens with unprecedented sensitivity. ASTENA is expected to be a real breakthrough in the gamma-ray energy band, opening a new window in high energy astrophysics. The development status of the mission concept and of the instrumentation on board will be reported.

The THESEUS mission: science goals, configuration and development status

Filippo Frontera

The THESEUS mission concept, proposed in response to the ESA call for medium-size mission (M5) within the Cosmic Vision Programme, has been selected to enter an assessment (0/A) phase study. The main scientific goals of THESEUS are: a) to explore the Early Universe (cosmic dawn and reionization era) by unveiling a complete census of the Gamma-Ray Burst (GRB) population in the first billion years in order to perform unprecedented studies of the global star formation history of the Universe up to z 10 and possibly beyond; detect and study the primordial (pop III) star population, and investigate the re-ionization epoch, the interstellar medium and the intergalactic medium up to z $\sim$ 8 - 10; b) to perform an unprecedented deep monitoring of the X-ray transient Universe in order to locate and identify the electromagnetic counterparts to sources of gravitational radiation and neutrinos, and provide accurate locations of (long/short) GRBs and high-energy transients for follow-up with next-generation optical-NIR, radio, X-rays and TeV telescopes. I will discuss how these goals will be achieved with THESEUS and its configuration as a result of the ESA CDF (Concurrent Design Facility) activity in order to prepare the industrial phase A study.

AXRO Welcome and Historical Background

Rene Hudec

AXRO Welcome and Historical Background will be given.

ESA SMILE and Czech participation

Rene Hudec

The Solar wind Magnetosphere Ionosphere Link Explorer, or SMILE, is a joint mission between the European Space Agency (ESA) and the Chinese Academy of Sciences (CAS). SMILE aims to build a more complete understanding of the Sun-Earth connection by measuring the solar wind and its dynamic interaction with the magnetosphere. The scientific payload includes the soft X-ray telescope SXI based on Lobster Eye optis for providing X ray images of X ray emitting regios in Earths magnetospehere. The Czech participation will be also discussed.

Orbiting blobs in SMBH accretion discs in the era of high-angular resolution and polarimetry

Vladimír Karas

Energy shifts of radiation are caused by the fast orbital motion and the gravitational redshift near a supermassive black hole (SMBH). Individual clumps of matter experience the effects of general relativity (GR) as they gradually proceed towards the event horizon. The supply of material is maintained by episodic tidal disruption events (TDE). The emerging radiation is modulated in the X-ray domain as well as in longer wavelengths. Changes of polarization properties of the observed signal exhibit a specific dependence on energy. We will summarise the recent progress in modelling the expected signal in the context of current and forthcoming observations. In particular, we will mention the polarimetric properties that can be revealed by the upcoming X-ray polarimetry.

SPO development for missions as Athena and Arcus

Boris Landgraf

The Silicon Pore Optics (SPO) technology has been established as a new type of x-ray optics that enables future x-ray observatories such as Athena and Arcus. SPO is being developed at cosine together with the European Space Agency (ESA) and academic as well as industrial partners. The SPO optics modules are lightweight, yet stiff, high-resolution x-ray optics, that shall allow missions to reach an unprecedentedly large effective area of several square meters, operating in the 0.2 to 12 keV band with an angular resolution better than 5 arc seconds. Based on SPO technology principles, cosine is also developing soft gamma-ray Laue lenses. Silicon Laue Components (SiLCs) consist of stacks of curved, polished, wedged silicon plates, allowing to focus radiation in both radial and azimuthal directions. In this paper, we are going to present development statuses of SPO and SiLCs. We will further discuss the latest generation production facilities for SPO and present results of the production of SPO mirror modules for a focal length of 12 m, including x-ray test results.

Methods for Soft X-ray Polarimetry

Herman Marshall

I will describe development and testing of components to be used to measure the polarization of soft X-rays for astronomical applications. We have acquired and tested multilayer coated mirrors with a lateral grading in order to match them to the dispersion of a grating-based spectrometer. We have demonstrated methods for the 0.15-0.40 keV band. We are also working on new components to expand the bandpass to 1-2 keV.

Optics for the Imaging X-ray Polarimetry Explorer (IXPE)

Herman Marshall

On behalf of the collaboration, I will describe the instrumentation of a NASA mission, the Imaging X-ray Polarimetry Explorer. The instrument, expected to launch in early 2021, would be the first in over 40 years to measure X-ray polarization of astronomical sources in the 2-8 keV band. IXPE will have full-shell optics with half-power diameter of less than 30 arc seconds from the Marshall Space Flight Center and photoelectron tracking detectors from Italy funded by ASi. I will describe the plan for calibration and examples of potential observations.

Advancements in reflection gratings for astronomical spectrographs

Randall McEntaffer

I will present an overview of the current state of reflection gratings for astronomical spectrographs. This will concentrate on gratings fabricated for X-ray and ultraviolet architectures. The talk will cover the current technological challenges and paths forward. The application of such gratings toward future missions including suborbital rockets, Explorers, and Lynx will also be discussed

Development of a silicon mirror for future X-ray missions using the hot plastic deformation process

Nozomi Nakaniwa

Silicon has a potential to be used for an X-ray mirror substrate, since it is material of low density and high mechanical stiffness, and its wafer with quite smooth surface is commercially available. Moreover, silicon has ductility near its melting point, it is possible to deform with its surface smoothness unchanged. Utilizing this characteristic, we have been manufacturing a conical silicon mirror from its wafer by means of the hot plastic deformation technique. Our mirror is the conical silicon mirror designed to have a radius of 100 mm, a length of 30∼mm, and a single reflection focal length of 4,550∼mm. I will present the current status of our development.

Speeding up Swift

John Nousek

NASAś Neil Gehrels Swift Observatory has functioned for a decade and a half as the worldś premier observatory for rapid time-domain astrophysics. The pace of extraordinary speed of discovery through programs such as the LIGO gravitational wave, IceCube neutrino sources and the LSST transient discovery program demands that Swift becomes even faster, and able to handle multiple simultaneous Target of Opportunity requests. I will outline our plans for new software development and operational management that both shorten Swiftś response times, and improve the operational request checking efficiency and capability. The improvement we envision will allow Swift to create full science plans on a timescale of less than a day, as compared to the current typical one day planning cycle.

Overview of ART-XC / SRG instrument

Mikhail Pavlinsky

Spectrum Roentgen Gamma (SRG) is an X-ray astrophysical observatory, developed by Russia in collaboration with Germany. The mission will be launched in March 2019 from Baikonur and placed in a 6-month-period halo orbit around L2. The scientific payload consists of two independent telescope arrays - a soft-x-ray survey instrument, eROSITA, being provided by Germany and a medium-x-ray-energy survey instrument ART-XC being developed by Russia. ART-XC will consist of seven independent, but co-aligned, telescope modules. The ART-XC flight mirror modules have been developed and fabricated at the NASA Marshall Space Flight Center (MSFC). Each mirror module will be aligned with a focal plane CdTe double-sided strip detector which will operate over the energy range of 4-30 keV, with an angular resolution of <1; a field of view of ∼0.3 deg2 in double reflection and an expected energy resolution of about 9% at 14 keV. The overview of the ART-XC/SRG instrument is presented here.

X-ray optics for astrophysical applications

Ladislav Pína

Presented work addresses the issue of X-ray optics for astrophysical applications. Various wide-field optical systems have been studied and developed. Two of them were used in space. One optical system is based on the use of 1D L̈obster eyeöptics as a part of the project VZLUSAT-1 CubeSat which is still operational on the polar orbit. The other one is based on the use of 2D L̈obster eyeöptics. This optical system was used in a student rocket experiment at Pennsylvania State University. Both optical systems were combined with Timepix X-ray detector for energy range 3 - 40 keV. Generally, test results performed with various selected modules of Multi Foil X-ray optics are presented.

Manufacture of Lightweight Silicon X-ray Mirrors for High-Resolution X-ray Astronomical Optics

Raul Riveros

At NASA Goddard Space Flight Center, we are developing a manufacturing process capable of producing lightweight sub-arcsecond X-ray mirrors made of directly polished single crystal silicon. Silicon is a nearly-ideal material for this application because it has high stiffness, low density, high thermal conductivity, zero internal stress, and commercial availability. Our manufacturing process involves traditional grinding, lapping, and polishing methods adapted to X-ray mirror geometry. This manufacturing process promises to meet the angular resolution, mass, cost, optical design, and schedule demands of various planned X-ray telescope missions. We are continually refining the many steps involved in our manufacturing process. This talk presents an overview of our mirror manufacturing process and the most recent results.

Long-term activity of binary X-ray sources in various energy bands

Vojtech Simon

Monitors of X-ray emission are important instruments for observing the activity of X-ray sources on the long timescales (e.g., years). Simultaneous monitoring of the same object with several monitors (e.g., with ISS/MAXI and Swift/BAT) and smoothing of the data by the one-day means enables us to investigate the activity in various energy bands (even spanning over several tens of kiloelectronvolts). It also enables to determine the hardness ratio of X-ray emission. This approach is useful also for the future satellites. We concentrate on observing X-ray binaries (mostly persistent sources) in which matter transfers onto the compact object (mostly the neutron star) from its lobe-filling companion. The orbital period is several hours or a few days. We will show that this activity sometimes shows cycles on the superorbital timescale (tens of days, months). These cycles may be present only in some X-ray bands, suggesting that X-ray emission is radiated in various emitting regions and/or by various emission mechanisms.

Analytic calculation of performance of lobster eye

Vladimir Tichy

An analytic model allowing calculation of effective collecting area of lobster eye optics is presented. The effecitve collecting area can correspond to spot only or to full point spread function. Equations for optimizing of the effective collecting area are presented. Examples are presented. Differences between results for the Angel and the Schmidt lobster eye design are discussed.

On mass of active galactic nucleus XMMUJ134736.6+173403

Gabriel Torok

A recent study of the X-ray source XMMUJ134736.6+173403 has revealed a strong quasi-periodic modulation of the X-ray flux. The observation of two quasiperiodic oscillations (QPOs) that occur on a daily timescale and exhibit a 3:1 frequency ratio strongly supports the evidence of an active galactic nucleus black hole (AGN BH) presence. Assuming orbital origin of QPOs we calculate the upper and lower limit on AGN BH mass M arriving at M 10^7-10^9Msun. Comparing that to mass estimates of other sources, XMMUJ134736.6+173403 appears to be the most massive source with commensurable QPO frequencies.

An X-ray Test Station for Micro Channel Optics

Richard Willingale

Micro Channel Optics with square pores are used to produce lobster eye X-ray mirrors. We will describe a dedicated facility designed and built to characterise the full performance of MCOs in X-rays. A single simple test using the facility gives information on the radius of curvature, efficiency and angular resolution of the MCO. It is intended that such a test station is used during the manufacture of MCOs to improve the quality of the final optics and as part of the optics characterisation during the integration of the MCOs into the lobster eye mirror.

Development of the lobster eye telescope onboard the Einstein Probe Mission

Richard Willingale

The WXT team of Einstein Probe The Einstein Probe (EP) is a small satellite dedicated to time-domain astronomy to monitor the sky in the soft X-ray band. It is a mission led by the Chinese Academy of Sciences and developed in its space science programme with international collaboration. Its wide-field imaging capability is achieved by using established technology of the micro-pore lobster-eye X-ray focusing optics. Complementary to this is deep X-ray follow-up capability enabled by a Wolter-I type X-ray telescope. EP is also capable of fast transient alerts triggering and downlink, aiming at multi-wavelength follow-up observations by the world-wide community. In this talk, we will briefly present the developments of Wide-Field Telescope, a Lobster-eye telescope, covering a FOV larger than 3600 square degrees, including the optics assembly, the focal plane detectors as well as the expected performances.

Development of X-ray Optics of Spectroscopic Focusing Array onboard the enhanced X-ray Timing and Polarimetry mission (eXTP)

Yanji Yang

Next Generation Astronomical X-ray Optics: High Resolution, Light Weight, and Low Cost

William Zhang

The state of the art of astronomical X-ray optics, represented by the three currently operating missions,Chandra, XMM-Newton, and NuSTAR, requires tradeoffs among three highly desirable quantities: 1) angular resolution, 2) effective area, and 3) production cost. For example,Chandra's mirror assembly, produced at an extremely high cost, is optimized for angular resolution at the expense of effective area. NuSTARś, however, produced at a very low cost, is optimized for large effective area at the expense of angular resolution. XMM-Newtonś, taking the middle road, achieves a modest angular resolution with a modest effective area at a modest cost. Future astronomical missions require X-ray mirror assemblies that are qualitatively better in all the three quantities: better angular resolution, larger effective area per unit mass, lower production cost per unit effective area. In this paper we report on a comprehensive X-ray astronomical optics development program at NASA Goddard Space Flight Center that has the potential to qualitatively advance the state of the art of X-ray optics manufacturing in all the three quantities: angular resolution, effective area, and production cost. It is based on precision-polishing of mono-crystalline silicon to make lightweight and thin mirror segments, coating of iridium film to maximize effective area, and an alignment and integration process that, as an intermediary step, constructs meta-shells which are subsequently integrated into a mirror assembly. The process imposes minimal constraint on each mirror segment and therefore minimizes degradation to angular resolution by thermal and gravity effects. We will report on optical design, mechanical design, thermal design, and stray light baffle design of a mirror assembly as well as test results of technology development modules, showing that sub-arc-second lightweight X-ray telescopes can be realized to meet large effective area, light weight, low production cost, and schedule requirements of future missions, including Explorer class missions such as the Survey

and Time-domain Astrophysical eXplorer (STAR-X) and the Focusing On Relativistic universe and Cosmic Evolution(FORCE), Probe missions such as the Advanced X-ray Imaging Satellite (AXIS) and the Transient Astrophysics Probe (TAP), as well as flagship missions such as Lynx.

Probing Bardeen-Petterson effect in tidal disruption events with spectral line reverberation mapping

Wenda Zhang

For inclined accretion flow around rotating black hole, the combined effect of Lense-Thirring precession and viscous torque tend to align the inner part of the flow with the black hole spin, leading to the formation of a warped disc, known as Bardeen-Petterson effect (Bardeen & Petterson 1975). In tidal disruption events (TDEs) in which a super-massive black hole starts to accrete the bound debris, if the black hole is spinning, in general the stellar orbit is inclined with the black hole spin. So is the accretion disc formed following circularization and radiative cooling of the debris. Xiang-Gruess et al. (2016) studied in detail stellar debris evolution and disc formation in TDEs when the stellar orbit is inclined, and found that warped disc would form under certain conditions. In this work we investigate properties of time-resolved fluorescent iron line originating from a warped disc that is irradiated by the initial X-ray flare. We find that the time-resolved spectrum shows distinct features before and after a critical time. This critical time depends on the Bardeen-Petterson radius, i.e., the outer boundary of the inner aligned disc; while the line width during the later stage of the X-ray flare is sensitive to the inclination of the outer disc flow. This demonstrates that time-resolved X-ray spectroscopy can be a powerful tool to probe the Bardeen-Petterson effect in TDE flares and can be used to measure Bardeen-Petterson radius as well as put constraint on black hole mass and spin.

Optics development for X-ray astronomy - a review on four joint Bavarian-Czech projects

Thorsten Döhring

Between 2016 and 2018 the Bavarian-Czech Academic Agency (BTHA) funded four bilateral projects between Aschaffenburg University and CVUT Prague. The effective combination of equipment, know-how, and manpower of both partners resulted in the development of stress-compensated iridium coatings for astronomical X-ray mirrors. The findings have been published at scientific conferences and in several joint papers. This poster gives a review on these collaborations and an outlook to the future.

KB X-ray Optics in AHEAD Project

Rene Hudec

We will briefly present and discuss the task of design, development and tests of KB (Kirkpatrick Baez) X-ray Optics within EU AHEAD Project

Modelling the jet kinematics of OJ287

Vladimír Karas

OJ287 belongs to one of the best candidates among active galactic nuclei to host the binary supermassive black hole at very close separation. Based on a recent analysis of 120 VLBA (Very Long Baseline Array) observations by Britzen et al. (2018), we set up a basic kinematical model to explain the motion of jet components. The model involves the jet precession, on top of which we find an indication of additional nutation-like motion for the first time. An alternative explanation is provided by the disc misalignment with respect to the spin of a single black hole

Preliminary design of a new diffuse soft X-ray spectrometer for sounding rockets

Drew Miles

I will present an early look at the design of a soft X-ray spectrometer designed to observe diffuse sources from a sounding rocket. The funded payload is estimated to launch in 2021. I provide here an update on the optical design, efforts in grating development, and detector solutions for the instrument.

Electroformed grazing incidence x-ray mirrors for future Japanese missions

Ikuyuki Mitsuishi

Dataprocessing of 1D lobster-eye Optics and Their Combination

Ondrej Nentvich

Lobster-eye optics is one of the X-ray telescopes which could be used as a wide field detector to catch fast transients or gamma ray bursts. Proposed algorithm is based on 1D optics with shading mask on input aperture.

Temperature Dependence of the Pixel Threshold for the Timepix Detector: Preliminary Results

Martin Urban

Timepix detector, as well as any other semiconductor detector, is affected by noise in the semiconductor structure. This poster describes very first results of the Timepix equalization and its validity under different conditions.

Bernd Aschenbach - PRV
Tomáš Báča - Czech Technical University in Prague
Landgraf Boris - cosine Research BV
Vadim Burwitz - MPI fuer extraterrestrische Physik
Maria D. Caballero-Garcia - Astronomical Institute of CAS
Brandon Chalifoux - MIT
Tanmoy Chattopadhyay - Penn State University
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Filippo Frontera - University of Ferrara and INAF-OAS Bologna
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Herman Marshall - MIT
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Randall McEntaffer - Penn State University
Drew Miles - Penn State University
Ikuyuki Mitsuishi - Nagoya University
Nozomi Nakaniwa - Tokyo Metropolitan University
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AXRO 2018 http://axro.cz
11th International Workshop on Astronomical X–Ray Optics
November 27-30, 2018 Prague, Villa Lanna

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