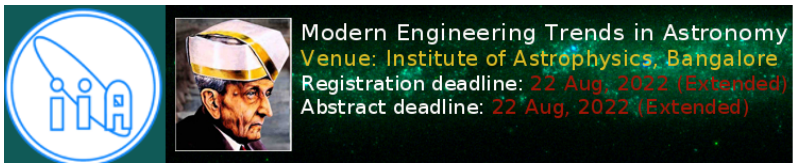
META-2022



Report of Contributions

https://events.iiap.res.in/e/meta2022

Contribution ID: **2** Type: **not specified**

Side Port Imager Design for 3.6m telescope

The Upcoming side port imager for 3.6m telescope is having a subsystems of Main structure, filter wheel, turret camera mount etc. the filter wheel in side port instrument is measuring Ø600mm and carrying 16 filters different sizes arranged in outer periphery of wheel and perpendicular to disk. the turret Camera mount is design to stare a different camera in same instruments. the Poster is covering of challenges faced in design and fabrications, secondly filter drive electronics design etc.

Presentation type

Poster

Primary authors: Dr OMAR, Amitesh (Scientist); Mr JAISWAR, Mukesh kumar (Electronics Engineer); Mr NANJAPPA, Nandish (Mechanical Engineer)

Presenters: Mr JAISWAR, Mukesh kumar (Electronics Engineer); Mr NANJAPPA, Nandish (Mechanical Engineer)

Contribution ID: **7** Type: **not specified**

NISP : A Near-Infrared Imager, Spectrometer and Polarimeter instrument

ABSTRACT :

NISP, a multifaceted near-infrared instrument for the upcoming 2.5m IR telescope at MIRO Gurushikhar, Mount Abu, Rajasthan, India is being developed at PRL, Ahmedabad. NISP will have wide (FOV = 10'x 10') field imaging, moderate (R=3000) spectroscopy and imaging polarimetry operating modes. It is designed based on 0.8 to 2.5 micron sensitive, 2048 X 2048 HgCdTe (MCT) array detector from Teledyne.
Optical, Mechanical and Electronics subsystems are being designed and developed in-house at PRL.
HAWAII-2RG (H2RG) detector will be mounted along with controlling SIDECAR ASIC inside LN2 filled cryogenic cooled dewar. FPGA based controller for H2RG and ASIC will be mounted outside the dewar at room temperature. Smart stepper motors will facilitate motion of filter wheels and optical components to realize different operating modes. Detector and ASIC temperatures are servo controlled using Lakeshore's Temperature Controller (TC) 336. Also several cryogenic temperatures will be monitored by TC for health checking of the instrument.
Detector, Motion and Temperature controllers onboard telescope will be interfaced to USB Hub and fiber-optic trans-receiver. Remote Host computer interface to remote end trans-receiver will be equipped with in-house developed GUI software to control all functionalities of NISP.
A poster on design and development aspects of NISP Electronics will be presented in this conference.

Presentation type

Poster

Primary author: Ms SINGH, Alka

Co-authors: Prof. GANESH, Shashikiran; Ms ROY SARKAR, Deekshya; Mr SHAH, Amish

Presenter: Ms SINGH, Alka

Contribution ID: **8** Type: **not specified**

FPGA Accelerated Cross Correlation of Digital Images: Application to Solar Adaptive Optics

Cross-correlation of two-dimensional digital images is fundamental to solar adaptive optics computations. It can be used in a simple tip-tilt correction system as well as in correlating sub-aperture images of a Shack-Hartmann wave-front sensor. While the software-based optimized cross-correlations may be sufficient when a small number of sub-apertures are used, hardware-accelerated (FPGA) correlations will be required when a large number of sub-aperture images are involved. In this presentation, we present our FPGA implementation of a basic two-dimensional cross-correlation of two images. We present four incrementally better architectures to accelerate the FPGA-based design. We achieve this by pipelining the individual components of the cross-correlation process, and thereby increase the speed. We implement our algorithm on several sets of 128x128 images and 32x32 images on a Xilinx Zynq based ZCU104 FPGA. Compared to existing work, our design performs a 2D FFT on a 128x128 image 9x faster while our cross correlation on a 32x32 image is 5x faster. This demonstrates that our method of FPGA based acceleration is beneficial in solar adaptive optics applications.

Presentation type

Oral

Primary author: DAS, Soham

Co-authors: Mr PHANINDRA, D.V.S. (Indian Institute o Astrophysics); Dr SRIDHARAN, Rengaswamy (Indian Institute o Astrophysics); Dr RAO, Nanditha (International Institute of Information Technology Bangalore)

Presenters: DAS, Soham; Mr PHANINDRA, D.V.S. (Indian Institute o Astrophysics); Dr RAO, Nanditha (International Institute of Information Technology Bangalore)

Contribution ID: **9** Type: **not specified**

Multi-Element Correlator & Beamformer using OpenCL on FPGA Accelerator Card

Radio Interferometry refers to the process of combining signals from multiple antennas to form an image of the radio source in the sky. Radio-astronomical signal processing using array telescopes is computationally challenging and poses strict performance and energy-efficiency requirements. The GMRT is one of the largest arrays with many antennas working in the metre wavelength. The ongoing developmental activities for expansion of the GMRT (called eGMRT) demand a many fold increase in the computational cost and power budget while providing an increased collecting area as well as field-of-view by building more antennas each equipped with phased array feed (PAF). Recent FPGAs provide higher Flops per Watt making it an energy-efficient hardware platform suitable for projects like the eGMRT requiring a high compute-to-power ratio. However, the traditional programming model for FPGAs is a primary drawback of using FPGAs for high-performance computing. Aided by the recent advancement of parallel programming on FPGAs using Open Computing Language (OpenCL), allows FPGAs to be used as general purpose accelerators like GPUs. The aim of this project is to design an energy-efficient multi-element correlator and beamformer on an FPGA Accelerator Card using OpenCL and to explore the possibilities of using such systems for real-time, number-crunching tasks.

To demonstrate this, we have developed a two-element interferometer and beamformer on an Intel's Arria-10 FPGA Accelerator Card using OpenCL. Digital signal processing modules used in radio telescopes like Fast Fourier Transform, Delay Correction, Fringe Stop, Correlation and Beamforming (Incoherent Array, IA as well as Phased Array, PA) are implemented using parallel processing techniques. The design supports real-time processing of 400MHz bandwidth. An offline 2-element, 100MHz bandwidth, 4096 points correlator providing 1.34s visibilities and 163.84 micosec beams (IA and/or PA) are implemented on the FPGA Accelerator card. The developments of this system as well as the results from processing recorded baseband data of calibrator and pulsar will be presented along with highlighting the comparison with the outputs from the GMRT Wideband Back-end (GWB) system. This project demonstrates a rapid development cycle of building a high-performance, energy-efficient system using low-power devices like FPGAs.

Presentation type

Oral

Primary authors: HOMBAL, Raghuttam (Savitribai Phule Pune University); MULEY, Mekhala (GMRT, NCRA-TIFR)

Co-authors: Mr REDDY, Harshvardhan S (GMRT, NCRA-TIFR); Mr KUDALE, Sanjay S (GMRT, NCRA-TIFR); Dr ROY, Jayanta (GMRT, NCRA-TIFR)

Presenter: HOMBAL, Raghuttam (Savitribai Phule Pune University)

Contribution ID: **10** Type: **not specified**

OVERVIEW OF GMRT ANTENNA FEED UPGRADE : CURRENT AND FUTURE WORKS

Will discuss about various antenna design concepts used for GMRT upgrade.

Presentation type

Oral

Primary author: Mr BANDARI, HANUMANTH RAO (TATA INSTITUTE OF FUNDAMENTAL RESEARCH)

Co-author: Mr S, SURESH KUMAR (TATA INSTITUTE OF FUNDAMENTAL RESEARCH)

Presenter: Mr BANDARI, HANUMANTH RAO (TATA INSTITUTE OF FUNDAMENTAL RESEARCH)

Contribution ID: **13** Type: **not specified**

Aluminizing the Primary Mirrors of Telescopes in ARIES

As a part of maintenance activities, primary mirrors of telescope 3.6m Devasthal Optical Telescope (DOT) at Devasthal and 1.04m Sampurnanand Telescope (ST) at Manora peak are being recoated every two or three years or depending upon the degradation of their reflectivity. The primary mirror of 3.6m DOT has been coated for four times since its installation in 2014 and the primary mirror of 1.04m ST has been coated for more than seven times since its installation in 1972. Detail procedure of recoating of primary mirrors which includes the unmounting of M1 from the cell, handling, removal of old coating, recoating and realignment with the cell will be briefed. Some brief description of coating plant facilities and how the coating is degrading for different primary mirrors over the years will also be presented. In-situ cleaning of the primary mirrors of ARIES telescopes will also be discussed.

Presentation type

Oral

Primary author: Mr B.KRISHNA REDDY, (ARIES)

Co-author: Mr JAYSHREEKAR PANT, (ARIES)

Presenter: Mr B.KRISHNA REDDY, (ARIES)

Contribution ID: **14** Type: **not specified**

Development of a spectrograph in the FUV region

The FUV (900-1800 Å) is the richest part of the spectrum in terms of emission lines –O VI (1032/1038 Å) and C IV (1548/1550 Å) from hot gas, C III (977 Å) and N III (1750 Å) from warm gas, and the Lyman and Werner bands of molecular hydrogen from cold gas. We are building a spectrograph (TINI) to map the extended objects observed by UVIT in the emission lines of atoms and molecules. The images trace the morphology of the objects; the spectra will explore the physics of the objects and how conditions vary over the nebula. The observed lines and line ratios are sensitive indicators of the temperatures and densities across the extended nebulae with the greatest density of lines occurring in the far-ultraviolet (FUV: 900 –1800 Å). Our detector is an innovative 40 x 40 mm GaN detector with a peak efficiency of 70%, currently being developed by the Institute of Astronomy and Astrophysics (IAAT) at University of Tübingen. UVIT has proven to be a critical mission in seeding the UV community in India. We believe that TINI will build on this interest and will be important for future missions such as INSIST and other astronomy

Presentation type

Poster

Primary authors: GHATUL, Shubham (Indian Institute of Astrophysics); CHANDRA, Bharat (Indian Institute of Astrophysics); G NAIR, Binukumar (Indian Institute of Astrophysics); MOHAN, Rekhesh (Indian Institute of Astrophysics); SAFONOVA, Margarita (Indian Institute of Astrophysics); MURTHY, Jayant (Indian Institute of Astrophysics)

Presenter: GHATUL, Shubham (Indian Institute of Astrophysics)

Contribution ID: **16** Type: **not specified**

Preliminary Design of Imager Filter Wheel Mechanism (IFWM) for Keck Observatory SCALES Instrument.

Slicer Combined with Array of Lenslets for Exoplanet Spectroscopy (SCALES) is a thermal infrared instrument for Keck-II to be built at W. M. Keck Observatory. Functionally, the instrument layout is divided into three parts, i.e., Fore-optics, IFS module, and Imaging Channel. The Imager filter wheel Mechanism is a part of the Imaging channel.
The Imager Filter Wheel Mechanism is a double-stacked filter wheel mechanism that hosts 2 open slots and 16 filters matched to the various imaging bandpass of the imager. The wheels rotate to bring the required filter into the FOV of the optical beam, and the whole system works under the cryogenic temperature, i.e., 77K. Designing an instrument for a cryogenic temperature and high vacuum environment is critical. It involves selecting drive mechanisms and parts materials compatible with the work environment. The other affecting parameter for the system is the temperature difference from room to cryogenic temperature. The system contracts and expands due to temperature changes. This demands the system to be carefully designed with proper choice of materials, selection of suitable machine elements, and control of dimensional tolerances to ensure the smooth running of the system in ambient as well as the cryogenic environment, without compromising on the tight tolerance requirements for the functioning of the optical systems.
The design, analysis, and calculation of the Imager Filter Wheel Mechanism will be presented in this talk, considering all parameters affecting the system design.

Presentation type

Oral

Primary author: Mr VARSHNEY, Hari Mohan (Indian Institute of Astrophysics)

Co-authors: Mr KV, Govinda (Indian Institute of Astrophysics); Mr MACDONALD, Nick (University of California, Santa Cruz, USA); Mr BANYAL, Ravinder K. (Indian Institute of Astrophysics); Mr PRAKASH, Ajin (Indian Institute of Astrophysics); Dr T, Sivarani (Indian Institute of Astrophysics); Mrs SETHURAM, Ramya (Indian Institute of Astrophysics); Mr J. SKEMER, Andy; Mr STELTER, Deno; RATLIFF, Chris; Mr HASAN, Amirul (Indian Institute of Astrophysics); Mrs KUPKE, Reni; SALLUM, Steph; DEICH, Will; P. FITZGERALD, Michael; Mr SURYA, Arun; WANG, Eric

Presenter: Mr VARSHNEY, Hari Mohan (Indian Institute of Astrophysics)

Contribution ID: **17** Type: **not specified**

The 50cm Robotic Telescope: Control System Upgrade and Automation

We describe the details into the design and development of a low-cost yet efficient telescope control system (TCS) and observatory control software (OCS) for the 50cm telescope at the Indian Astronomical Observatory. The TCS and OCS facilitate precise pointing and tracking of the main axes, handle peripheral sub systems such as the secondary focuser and the filter wheel, conduct observation, monitor weather and incorporate safety interlocks, aimed to run the telescope in a robotic manner. The TCS comprises a computer, control hardware components and an efficient programmable system on chip (PSoC) based motion controller. A distributed control architecture on the controller area network (CAN) bus allows for controlling many subsystems in a modular fashion. The control algorithm comprises the close loop proportional integral derivative (PID) controller and the motion profiler, which ensure very precise pointing and tracking performances. After optimum tuning of the PID gains, we could achieve performance that otherwise one can expect only in large telescopes. The maximum velocity and acceleration of the telescope is set to 2°/sec and 0.2°/sec2 respectively, which can go up to 10°/sec and 1°/sec2 in case of transient observations. The control level pointing accuracy is 3 arc-seconds and unguided sidereal tracking accuracy of 2 arc-seconds over 10 minutes is achieved.
The TCS related high-level calculations such as topo-centric and geocentric corrections and the pointing model etc. are carried out in a dedicated computer system, whereas the low-level control program runs in the PSoC. The pointing model software developed is automated and computes the coefficients by image processing using the plate solve method. The OCS which is the top most layer in the control architecture, handles the filter wheel, the detector, the enclosure, the weather station as well as many safety mechanisms. The OCS combined with the scheduler tool and client-server architecture facilitates the un-manned operation of the telescope.

Presentation type

Oral

Primary authors: STANZIN, Tsewang; Mr JORPHAIL, Sonam; Prof. PARIHAR, Padmakar Singh (IIA); ANGCHUK, Dorje (IIA); Mr DORJAI, Tsewang; Mr GYALSON, Tsewang; Mr MAHAY, Tashi Thsering; Mr DORJAY, Padma; Mr DORJAY, Phuntsok; Mr PAMBER, Tashi; Mr PHUNCHOK, Tsewang; Mr STANZIN, Urgain; Mr ANGDU, Skalzang

Presenter: STANZIN, Tsewang

Contribution ID: **18** Type: **not specified**

Balloon-borne Payload Module: Collection of Micrometeorite Dust at High Altitudes in Earth's Atmosphere

The Earth has a wide range of environmental factors that enable complex biological life to exist. The conditions at higher altitudes of the atmosphere not only imply comparable environmental conditions as those of land surfaces of certain planets, but also prove to be a site of meteorite showers, resulting in an abundance of cosmic dust and micrometeorite pieces. It is desirable to collect this dust and examine it on the ground to understand its nature in the perspective of extraterrestrial life and the significance of its composition by concentrating research on cosmic dust in the upper stratosphere between 30 km and 40 km in altitude.

To accomplish the objective of retrieving this dust, a mechanical payload is created with a very practical approach, allowing the payload design to serve as an easily replicable, inexpensive, structurally sound, safe, and co-integrated module in balloon flight missions for collecting the micrometeorite dust. The collector is built with the safety measures to withstand impact pressures and simultaneously safeguard the collected media. The entire design was created in-house and is entirely novel, with modifications made to the materials chosen for weight reduction and stress reduction of all kinds. This research has also included material testing with production procedures for redesigned payload parts. The development of a whole module, including manufacturing and testing, will serve as a comprehensive tool for routinely carrying out higher atmospheric studies. An engineering prototype for high-altitude dust collection is built and tested, and a microcontroller board with the necessary sensors (GPS, barometer, etc.) is designed and programmed (in C language) to open and close the collector tray at an appropriate height ~ 25 km. The opening and closing of the tray attached to the collector were tested in a chamber at an ambient temperature of -80℃. For our sample collector, the embedded device platform Arduino Uno serves as the primary controller, where the C language is used to write the implementation code. The collector measures altitude using a GPS module and a BMP180 pressure sensor that are both connected to the Arduino board. The dust collection and accurate identification of the material is the primary objective of this mission in which the study techniques are split into physical and biological categories.

Presentation type

Oral

Primary authors: ARORA, Diksha; RAJ, Harshit; GAJJAR, Dhruv (Ramaiah Institute of Technology); SRIVASTAVA, Rashi (Central University of Karnataka); SAHOO, Jagannath Prasad (Ramaiah Institute of Technology); SAFONOVA, Margarita (Indian Institute of Astrophysics); GOPALAKRISHNAN, Binukumar (Indian Institute of Astrophysics); CHANDRA, Bharat; GHATUL, Shubham (Indian Institute of Astrophysics); MOHAN, Rekhesh (Indian Institute of Astrophysics); MURTHY, Jayant

Presenter: ARORA, Diksha

Contribution ID: **19** Type: **not specified**

Sample - Stratospheric Altitude Microbiology Probe For Life Existence - A Balloon Borne Payload System To For Cosmic Dust Collection In The Stratosphere

Sample - Stratospheric Altitude Microbiology Probe For Life Existence - A Balloon Borne Payload System To For Cosmic Dust Collection In The Stratosphere

Authors:
1. Rashi Srivastava, Central University of Karnataka
2. Dr. Margarita Safonova, Indian Institute of Astrophysics
3. Dr. Binukumar G. Nair, Indian Institute of Astrophysics
4. Bharat Chandra P, Indian Institute of Astrophysics
5. Ghatul Shubham Jankiram, Indian Institute of Astrophysics
6. Dr. Rekhesh Mohan, Indian Institute of Astrophysics
7. Dr. Jayant Murthy, Indian Institute of Astrophysics

Although the existence of microorganisms in the troposphere is well recognised and well-catalogued, very little is actually understood about the biosphere's ultimate upper limit. The stratosphere provides an ideal setting to investigate whether life can exist or survive in these circumstances. In order to explore and examine this, a balloon-borne payload system; SAMPLE (Stratospheric Altitude Microbiology Probe for Life Existence) has been designed, which embodies a dust collection chamber on the payload along with various other subsystems. An engineering prototype for high-altitude dust collection is built and tested, and a microcontroller board with the necessary sensors (GPS, barometer, etc.) is designed and programmed (in C language) to open and close the collector tray at an appropriate height. The payload is made up of pre-sterilized sampling chambers that are intended to collect and hold dust samples during the flight and deliver them back to the surface without contamination, as well as a controller that chooses the payload system's altitude and actively monitors the opening and closing of the sampling chambers. The motor arrangement drives a lead screw, which causes the collection tray to swivel in and out. A bidirectional movable latch and lock system limits mobility.

The main electronic components are the GSM module, pressure sensor, and SD Card module. For our sample collector, the embedded device platform Arduino Uno serves as the primary controller, where the C language is used to write the implementation code. The collector measures altitude using a GPS module and a BMP180 pressure sensor that are both connected to the Arduino board. Using an L293D motor controller IC, the Arduino manages the DC motor that opens and closes the tray. A 7V Li-ion battery powers the entire system. First, the Airport Authority of India has limited the total payload weight of the payloads to 6 kg. Second, all equipment needs to be resistant to temperature changes because the stratosphere can reach temperatures as low as 80℃. To ensure that the electronic components work properly, they were insulated for survival at that temperature. The opening and closing of the tray attached to the collector was tested in a chamber at an ambient temperature of -80℃. Since it was noted that the collected CPAs (chondritic porous aggregates) at altitudes of 17–20 km contained a significant amount of contaminants from volcanic eruptions, we intend to configure the dust collector chamber to open the trays above 25 km. As a result, as soon as the payload passes that altitude during the descent, the trays would retract. The dust collection and accurate identification of the material is the primary objective of the SAMPLE mission in which the study techniques are split into physical and biological categories.

Presentation type

Poster

Primary author: SRIVASTAVA, Rashi (Central University of Karnataka)

Co-authors: Dr SAFONOVA, Margarita (Indian Institute of Astrophysics); Dr G NAIR, Binukumar (Indian Institute of Astrophysics); Mr CHANDRA, Bharat (Indian Institute of Astrophysics); Mr JANKIRAM, Ghatul Shubham (Indian Institute of Astrophysics); Dr MOHAN, Rekhesh (Indian Institute of Astrophysics); Prof. MURTHY, Jayant (Indian Institute of Astrophysics)

Presenter: SRIVASTAVA, Rashi (Central University of Karnataka)

Contribution ID: **20** Type: **not specified**

A portable, low-cost multispectral system for monitoring night sky brightness over the astronomical sites

Light pollution, resulting from excessive, ubiquitous, and improperly directed artificial light sources in the surrounding region of several astronomical sites is a matter of great concern. Deterioration and washing out of the natural dark skies due to the proliferation of anthropogenic light pollution over these sites adversely affect the efficiency and quality of astronomical observations due to the scattering of artificial light in the atmosphere. Various methods exist to measure and monitor the level of night sky brightness (NSB) over astronomical sites, including both natural and artificial light contributions; some of these methods are - astronomical photometry, satellite remote sensing, and instrumental. The present work discusses the instrumental method, which could be panchromatic or multispectral. The simplest measurement of sky brightness is achieved mainly using DigiLum Luminance Meter, Mark Light Meter, and Sky Quality Meters (SQMs), which are panchromatic. However, to track the change in colour of the sky (e.g., to follow the change in colour of the newly installed lighting devices), a multispectral approach is needed. In addition to the panchromatic measurements, two portable, low-cost multispectral systems have been developed for monitoring the NSB over the observational facilities at Manora Peak and Devasthal sites of Aryabhatta Research Institute of observational sciencES (ARIES). The developed multispectral units are direct current (DC)-operated, Internet of Things (IoT) based systems that measure the night sky brightness in magnitudes per square arc second (mag arcsec-2). Additionally, the system also captures photographic images of the night sky and records the global positioning (GPS) information, and environmental parameters like temperature, pressure, and humidity at set intervals.

Presentation type

Oral

Primary authors: KUMAR, Ashish (ARIES); T. S., Kumar (ARIES)

Presenter: KUMAR, Ashish (ARIES)

Contribution ID: **22** Type: **not specified**

Electronics subsystem development of SING spectrograph payload

SING is a near ultraviolet (NUV) spectrograph which operates in the wavelength range from 1400 Å to 2700 Å, with a spectral resolution of about 3 Å at 2000 Å. The spectrograph is intended to operate in low Earth orbit (LEO), with the primary goal to generate spectral maps of the regions of the sky covered within the field of view (FOV) of the instrument, constrained by the orbital inclination of the spacecraft. As the event rate in the UV is low, the spectrograph employs a photon-counting detector because of its low noise performance. SING on-board electronics consists of 4 subsystems- a photon counting detector based on Raspberry Pi 3, an on-board computer (OBC) based on an STM32 microcontroller, a power supply and a 1553B communication module. Here we will present the low-cost development of the four subsystems using COTS (commercial-off-the-shelf) components.

Presentation type

Oral

Primary authors: Mr CHANDRA P, Bharat; GHATUL, Shubham (Indian Institute of Astrophysics); Ms JAIN, Shubhangi (Indian Institute of Astrophysics); GOPALAKRISHNAN, Binukumar (Indian Institute of Astrophysics); MOHAN, Rekhesh (Indian Institute of Astrophysics); MURTHY, Jayant (Indian Institute of Astrophysics); SAFONOVA, Margarita (Indian Institute of Astrophysics)

Presenter: Mr CHANDRA P, Bharat

Contribution ID: **23** Type: **not specified**

Upgradation in the Filter slide motion mechanism for 1.3m DFOT

The 1.3-m Devasthal Fast Optical Telescope (DFOT) from DFM Engineering Inc. USA is installed at the Devasthal site of ARIES. Telescope has a fork equatorial mount, friction drives for its motions and is enclosed in an in-house fabricated roll-off roof. It is used for various scientific observations such as follow-up of transient events, studies of variable stars, star clusters and galaxies etc. The auto guider of the telescope has a pick-off mirror, guide camera and a filter slide. The filter slide has a provision for mounting eight filters. The linear motion to the filter slide is through the motorized arrangement. Presently, observations demanding fast sampling of images are limited due to the slow motion mechanism. Trials of fast motion with the existing system were performed in the past but had limited success due to various limitations in the system. Upgradations in the motion mechanism of the filter slide are planned with a modified system. The presentation will discuss the limitations in the present system and modifications in progress for the existing system to minimize the time delay between two successive science observations.

Presentation type

Oral

Primary author: BANGIA, Tarun (ARIES)

Presenter: BANGIA, Tarun (ARIES)

Contribution ID: **24** Type: **not specified**

Design and Development of DMD Controller Interface for INSIST

The INSIST (Indian Spectroscopic and Imaging Space Telescope) is a UV-optical 1m class telescope expected to produce high quality imaging and moderate resolution spectra of astronomical sources. INSIST is in the pre-project phase where a few critical sub-systems are being demonstrated. A Digital Micromirror Device (DMD) will be used in front of the onboard spectrograph for sampling light coming from astronomical sources of interest in the light path. The role of DMD here is similar to slit mask used in the conventional spectrographs. DMD comprises of tiny mirrorlets arranged in the form of pixels which can be flipped between two pre-defined positions by applying digital signals. By selecting the appropriate pixels on the DMD the required slit mask shape can be configured. In this project, a controller interface module to transfer the slit mask pattern to the DMD device is under development. This controller interface takes the data from user, which contains how many rows and columns of DMD to be flipped for particular observation. At the initial stage of development, this slit mask input will be directly in the form of row and column numbers. At later stage we will derive the row and column based on the acquired image from the imaging channel. This module will convert Row and Column data in a format which is suitable to the DMD chipset and transfer it to chipset with suitable command format. Controller interface module will receive telemetry of DMD chipset and displays the health of DMD. Presently the design and development of this controller is under progress and firmware to send and receive data will be will be presented in this poster.

Presentation type

Poster

Primary author: JAIN, Shubhangi (IIA BENGALURU)

Co-authors: Ms PK, SISIRA; Mr KUMAR, AMIT; Dr DESHMUKH , Prasanna

Presenter: JAIN, Shubhangi (IIA BENGALURU)

Contribution ID: **25** Type: **not specified**

Upgraded GMRT baseband signal processing for VLBI

The upgraded GMRT (uGMRT) offering nearly seamless wideband coverage from 50 MHz to 1500 MHz is one of the most sensitive low frequency radio telescopes in the world. Its enhanced capabilities along with its unique geographical location offers tremendous potential for VLBI. Previous fringe test experiments with the legacy GMRT and the European and Australian VLBI networks showed that the Rubidium clock, though adequate for low frequencies, could not provide sufficient clock stability to maintain fringe stability across longer durations. The difficulty was compounded by the lack of seamless frequency coverage and the requirement of converting the 16.666/33.333 MHz GSB baseband data to VLBI-ready bandwidths. However, with the H-maser reference and the larger bandwidths provided by the GWB along with new software instrumentation enabling selectable bandwidths, VLBI can now be done routinely with the GMRT.

In this talk, we describe the three different digital backend modes of recording baseband data with the uGMRT : (i) voltage data from a single GMRT antenna with 16 MHz bandwidth, captured via a stand-alone set-up; (ii) voltage data from up to 2 GMRT antennas, tapping the signal from the main uGMRT back-end, for bandwidths up to 100 MHz; and (iii) spectral voltage data from the tied array output of the uGMRT back-end with any number of GMRT antennas added in phase (PASV), for bandwidths of 50/100/200/400 MHz. Off-line processing routines were developed and tested for : (a) converting spectral voltage data to time domain voltage data with provision for converting to VLBI friendly bandwidths (32/64/128/256 MHz); (b) filter and resample voltage data for bandwidths such as 100 MHz, to VLBI friendly bandwidths; and (c) routine to translate the final voltage data to VDIF format, including options for setting the number of bits to 8, 4 or 2. Out of the three modes of baseband recording, the PASV or the tied array mode along with the offline processing routines offers better suitability because of higher sensitivity, flexibility to select any part of the band and record multiple baseband beams concurrently. We will also briefly present the results of the tests conducted with the European VLBI network and the future growth path to make regular VLBI observations with the uGMRT.

Presentation type

Poster

Primary authors: Mr REDDY, Harshavardhan (NCRA-TIFR); Dr MARTHI, Visweshwar Ram (NCRA-TIFR, Pune); Mr CHAUDHARI, Sandeep (NCRA-TIFR, Pune); Mr HANDE, Prakash (NCRA-TIFR, Pune); Prof. JOSHI, Bal Chandra (NCRA-TIFR, Pune); Mr KUMAR, Ajith (NCRA-TIFR, Pune); Mr KUDALE, Sanjay (NCRA-TIFR, Pune); Prof. KHARB, Preeti (NCRA-TIFR, Pune); Prof. GUPTA, Yashwant (NCRA-TIFR, Pune)

Presenter: Mr REDDY, Harshavardhan (NCRA-TIFR)

Contribution ID: **26** Type: **not specified**

ASSESSING THE PERFORMANCE OF A DIGITAL MICROMIRROR DEVICE (DMD) BASED MULTI-OBJECT SPECTROGRAPH (MOS) FOR THE INDIAN SPECTROSCOPIC AND IMAGING SPACE TELESCOPE (INSIST)

The coming decade in astronomy focuses on large wide field imaging and spectroscopic surveys. At present, no wide field imaging or multi-object spectroscopic facilities extend to the UV region, which represents an important window into a wide variety of astrophysical problems. Combining a large focal area with a simple and efficient optical design, the Indian Spectroscopic and Imaging Space Telescope (INSIST) is a UV-optical 1m class telescope expected to produce very high quality images and moderate resolution spectra of astronomical sources. INSIST will allow astronomers to probe a variety of science drivers, ranging from the physical and chemical properties of stellar systems, galaxy evolution in groups and clusters, chemo-dynamics and demographics of the nearby universe, to near- and far-field cosmology.

INSIST plans to tackle these challenges using a digital micromirror device (DMD) based multi-object spectrograph (MOS). DMD is a binary light modulator that consists of a programmable rectangular array of 1920x1080 square micromirrors, each of which can be tilted between two stable states, at +12 and -12 degrees from the device normal. The micromirrors of the DMD will act as slits, either reflecting light towards or away from the spectrograph. The MOS covers a wavelength range of 150 nm - 300 nm and delivers a resolving power of ~600 at the mean wavelength.

DMD is to be used in a telescope in the UV region for MOS application for the first time in space. Hence, it is necessary to understand and study the functionality of DMD and its suitability to space telescopes. The work presented here focuses on testing the performance and functionality of the DMD in the optical region. Some of the performance metrics explored are the extent of the spectra, repeatability of the micromirrors, optical contrast ratio, reflectivity studies, to name a few. We design a system with an imaging channel and a spectrograph channel with the DMD, and report on the various results obtained.

Presentation type

Oral

Primary authors: HOODATI, ANWESHA (INDIAN INSTITUTE OF ASTROPHYSICS); JAINI, Akhil (Indian Institute of Astrophysics); KOLLANNUR THARAYIL HOUSE, Della (Christ University); SRIPADMANABAN, Sriram (Indian Institute of Astrophysics)

Presenter: HOODATI, ANWESHA (INDIAN INSTITUTE OF ASTROPHYSICS)

Contribution ID: **27** Type: **not specified**

Radio Telescope for 21 cm H-Line

Horn antenna has proved its worth in Radio Astronomy applications. Due to sophisticated technology & high cost, the use of horn antenna is limited to professional applications only. A cheap & easy to construct horn antenna for 21cm H-line applications is developed that can be used for education at the school & college level and also for scientific outreach & popularization activities within 7500 INR. The aperture of the horn is 75.4 x 58.7 cm2 and has a gain of about 20dB. The receiver system consists of a combination of LNA & BPF, SDR, and software to process the signals. The project can be taken forward to experiment with finding the rotation curve for mapping of our galaxy and interferometry applications.

Presentation type

Poster

Primary author: TIWARI, Harshit

Presenter: TIWARI, Harshit

Contribution ID: **28** Type: **not specified**

Optomechanical design and analysis of SING spectrograph

The Spectroscopic Investigation of Nebular Gas (SING) payload is a near ultraviolet (NUV) imaging spectrograph, which is designed to operate in the wavelength range from 1400 Å to 2700 Å, with a spectral resolution of ~2 Å at 2200 Å. This spectrograph is designed to map the astrophysical spectrum at moderate spatial and spectral resolution in the NUV from a stable Chinese modular space station. The Observational Targets for SING are supernova remnants, planetary nebulae, star formation in nearby galaxies, and emissions from their extended halos. In this work, we will present the design modelling, optimization and analysis of the sub-assemblies and system-level assembly of the spectrograph.

Presentation type

Oral

Primary authors: CHANDRA, Bharath (Indian Institute of Astrophysics); GOPALAKRISHNAN, Binukumar (Indian Institute of Astrophysics); Prof. MURTHY, Jayant (IIa); Dr SAFANOVA, Margarita (IIA); Dr MOHAN, Rekhesh (Indian Institute of astrophysics); Mr GHATUL, Shubham (IIA)

Presenter: GOPALAKRISHNAN, Binukumar (Indian Institute of Astrophysics)

Contribution ID: **29** Type: **not specified**

Mechanical Engineering & modern Observational Science,—– with emerging Manufacturing Technology.

META 2022

Title: - Mechanical Engineering & modern Observational Science,—– with emerging Manufacturing Technology.

Abstract:-

Mechanical Engineering is an inevitable segment of today's Scientific Research. A Mechanical Engineer can illuminate the manifold domains of Scientific Research viz. from Aerospace to Observational Science and from Automotive to Nuclear and Nanotechnology. Mechanical Engineering has been serving the field of Observational Sciences/Space Sciences by design, manufacturing, assembly,installation,commissioning & servicing of Telescope,Dome,Overhead Roll Off Roof, Back End Instruments , as well as design, build, test, maintain and repair spacecraft as well as related equipment and systems. The Mechanical based Manufacturing Technology has intensified itself from conventional process to Computerised Numerical Control (CNC) process, with respect to the meticulous demand of scientific sector. In this article, it has been significantly emphasised on ; to discuss about the issue of contribution of Mechanical Engineering in the field of Research on Observational Science, with emerging Manufacturing Technology, which could be ratified as a paradigm shift.

Key Words:-Machine Tools,Conventional Process,CNC,VMC,Machining Centre,Programming,Quality Control,Inspection,Total Quality Management,KAIZEN,OEE,KPI,CMM,Welding,Assembly,Estimation & Costing,Laser Cutting,Press Tool,Production Planning,Cutting Tools,Measuring Tools etc.

Presentation type

Oral

Primary author: Mr CHAKRABORTY, PRADIP (ARIES,Nainital)

Presenter: Mr CHAKRABORTY, PRADIP (ARIES,Nainital)

Contribution ID: **30** Type: **not specified**

Dome Automation of ARIES Schmidt Telescope

Dome Automation of ARIES Schmidt Telescope

Shobhit Yadava 1, TS Kumar 1

1 Aryabhatta Research Institute of Observational Sciences, Manora Peak, Nainital-263001, India

Corresponding Author(s): shobhit@aries.res.in, kumar@aries.res.in

Abstract: Schmidt telescope dome comprises of rotating steel structure with shutter and presently operating in manual mode. We describe here the electrical aspects of the proposed Schmidt telescope dome automation which is installed at ARIES, Nainital. Our system will enable the user to control the dome's azimuth rotation, and shutter operation for its opening and closing. The system is developed using dsPIC microcontroller with a suitable firmware for controlling the observatory dome and provide telemetry for PC based control. The controller interfaces with optically isolated relay modules and limit switches for end to end operation of the shutter motor via power contactors. The power contactors will be later replaced with VFDs for increasing the life of the mechanism and motors. Dome rotation is feedback controlled via absolute multi-turn encoder and a variable frequency drive which powers the three phase dome motors. Currently, a sequences that open and close the shutter, rotate the dome in azimuth at set velocity and park the dome to the users preferred orientation have been implemented. In addition, CAN interface and wireless Zigbee communication have been implemented for both distributed networking of the controllers and direct access of the individual controllers respectively. The VFD can be separately configured for controlling the acceleration and deceleration rates, which allows longevity to the motors. Currently, we are testing the dome for positioning accuracy, repeatability and slippages and in the process of determining the optimal control parameters.

Presentation type

Oral

Primary authors: YADAVA, shobhit (ARIES Nainital - 263001); T. S., Kumar (ARIES)

Presenters: YADAVA, shobhit (ARIES Nainital - 263001); T. S., Kumar (ARIES)

Contribution ID: **31** Type: **not specified**

Upgradation of integral auto guider unit subsystem of the 3.6 m DOT

We present here the current status of the 3.6 m Devasthal Optical Telescope auto guider unit subsystem and discuss the upgradations being performed. This includes complete redesigning of the integrated three-axis auto guider unit which consists of a guiding CCD camera and a CCD based wavefront sensor. The unit is supported on a three-axis system for scanning the two dimensional field and focusing on the guide star. Due to the obsolescence and failure of the CCD cameras and maintenance efforts required for such cameras with mechanical shutters, these are being replaced with next generation shutterless scientific CMOS cameras. To accommodate the new interface, suitable mechanical, electrical, optics and software modifications were carried out inhouse. The performance of sCMOS detector was initially characterized in laboratory and later onsky using the 1.3 m telescope. Currently, the upgradation has been completed and the performance of the subsystem is being tested. In this presentation the upgradation efforts and performance of the sCMOS camera will be discussed.

Presentation type

Oral

Primary authors: T. S., Kumar (ARIES); REDDY, Krishna (ARIES); NANJAPPA, Nandish (ARIES); KUMAR, Ashish (ARIES)

Presenter: T. S., Kumar (ARIES)

Contribution ID: **32** Type: **not specified**

Design & Development of Grating Exchanger (GRX) for TMT-Wide Field Optical Spectrograph

The Wide Field Optical Spectrometer (WFOS) is an instrument under development for the first-light operation of the Thirty Meter Telescope (TMT), which will provide high throughput across the entire wavelength range of 310-1000 nm, including the extreme blue and red wavelengths. In order to achieve that, the design has a two-channel spectrograph layout, a red and a blue channel. Each channel has a separate grating, camera & detector system.
The grating exchanger is required for both red & blue channels to exchange the gratings for low, medium & high-resolution modes and filters for image mode. The rotation angles for the gratings/filters are different for each mode. The main challenge in designing the grating exchanger is the space constraint due to several other optomechanical systems requiring different gratings/filters to facilitate various observing modes. The allocated time budget for exchange to switch between observing modes is also a critical challenge that limits serial operations. In addition, it is essential to maintain the position and angular accuracy of placement of the grating in its place. The same is to be maintained through its expected functional life of about 50 years, considering the wear and tear of the moving elements.
Different trade-off design studies have been done to reach the conceptual design of the grating exchanger. The final conceptual design has 5 degrees of motion for exchanging the gratings/filters. The trade-off designs and finalized conceptual design of the grating exchanger, including calculations and kinematic assessment, will be presented in this talk.

Presentation type

Oral

Primary author: Mr VARSHNEY, Hari Mohan (Indian Institute of Astrophysics)

Co-authors: KV, Govinda (IIAP); Mr NASH, Reston (California Institute of Technology, USA); SETHURAM, Ramya (Indian Institute of Astrophysics); Mr N., Viswanatha (Indian Institute of Astrophysics); KAMBHALA, SUDHARSAN; PRAKASH, Ajin (Indian Institute of Astrophysics); T, Sivarani (Indian Institute of Astrophysics); HASAN, Amirul (Indian Institute of Astrophysics Bangalore); Mr T.S., Kumar (Aryabhatta Research Institute of Observational Sciences, INDIA); NIGAM, Vaishaly; Mr STEIDEL, Chuck (California Institute of Technology, USA); Mr LASI, Davide (TMT International Observatory); Mr PENG, Eric (Peking University, China); Mr FUCIK, Jason (California Institute of Technology, USA)

Presenter: Mr VARSHNEY, Hari Mohan (Indian Institute of Astrophysics)

Contribution ID: **33** Type: **not specified**

Real-time Broadband RFI Filtering System for uGMRT: Overview of the Released System and Future Plans

A real-time Radio Frequency Interference (RFI) filtering system has been commissioned and released for the Upgraded GMRT (uGMRT) users. Over the last couple of years, there has been a significant increase in the usage of the system. The system helps filter broadband powerline RFI, a dominant source of interference at frequencies below 800 MHz. This system is the first to be implemented in a radio telescope backend and released for astronomical observations. Engineering results show up to 10 dB improvement in the signal-to-noise ratio, whereas we see up to 3 dB improvement for continuum imaging and pulsar observations. Here, we describe the challenges faced and solutions adopted in implementing the RFI filtering system in real-time on the FPGA platform, testing it, understanding the effects of filtering on astronomical data, and releasing it for uGMRT observations. We would also describe the RFI statistics gathered over the last couple of years, including the possibility of using the filtering system for long-term monitoring of powerline RFI.

As a next step towards refining the filtering system, we are working towards a machine learning-based model which could adapt to the variation in the duration, amplitude, and occurrence of powerline RFI. Concerning this, we are studying the statistical properties of the composite RFI signal using high-resolution time-domain data collected over the last few years in various uGMRT observing bands. We give a glimpse of the results from this analysis and the scope for going towards a more intelligent filtering algorithm using a combination of statistical learning and signal processing.

We are also working on understanding the overall computational requirements and porting the system on modern FPGA, CPU, and GPU platforms. We would present initial results from this ongoing development which would help make the system more amenable for implementation in other radio telescope backends.

Presentation type

Oral

Primary author: Mr BUCH, Kaushal (Giant Metrewave Radio Telescope, NCRA-TIFR)

Co-authors: Dr KALE, Ruta (NCRA-TIFR); Prof. OBEROI, Divya (NCRA-TIFR); Mr B., Ajithkumar (GMRT, NCRA-TIFR)

Presenter: Mr BUCH, Kaushal (Giant Metrewave Radio Telescope, NCRA-TIFR)

Contribution ID: **34** Type: **not specified**

Full Stokes Polarimeter for Characterization of Retarders

Polarimeters are useful devices that help understand the polarization state of electromagnetic radiation. As such, they find applications in astronomy, medicine, crystallography, ellipsometry, remote sensing, and so on. Over the past few decades, IIA has built several polarimeters for astronomical observations. Continuing this activity, we have developed a full-stokes polarimeter that can be used to characterize waveplates -which will later be extended for astronomical observations. The setup consists of two parts: Polarization State Generator (PSG), which generates a known State of Polarization (SoP) for illuminating the sample, and Polarization State Analyser (PSA), which analyses the output SoP from the sample. The PSA thus characterizes the sample by measuring the deviation introduced by the sample in the PSG-generated SoP. The setup is designed such that the sample need not be rotated while characterizing. Also, the surface of the sample can be imaged onto a camera. This image is used to characterize the retardance at various points across the sample's surface. We developed the software to interface with the camera in Python. Using the wrapper developed in Cython, the Python software interacts with the API of the camera driver. In this talk, we present the construction of the polarimeter and demonstrate the characterization results of commercially available standard waveplates at various wavelengths.

Presentation type

Oral

Primary authors: DVS, Phanindra (Indian Institute of Astrophysics); ABDUL LATEEF, Syed; Dr K, Nagaraju (Indian Institute of Astrophysics)

Presenters: DVS, Phanindra (Indian Institute of Astrophysics); ABDUL LATEEF, Syed

Contribution ID: **35** Type: **not specified**

An Overview of EMI/EMC Testing and Mitigation Techniques

Abstract

With the advanced technology in electrical/electronic (EE) systems and its applications in the field of Astronomy and Space Sciences, the functionality of EE systems and instruments in an intended/unintended Electromagnetic (EM) environment is crucial. This is ensured by conducting EMI (Electromagnetic Interference) and EMC (Electromagnetic Compatibility) testing. In a product development lifecycle, EMI/EMC is a multi-phase testing and goes parallel with the design of individual sub-units of an EE system. In order to do so, a list of tests are conducted such as Radiated Emission (RE), Conducted Emission (CE), Radiated Immunity (RI), Conducted Immunity (CI) etc. as per EMI/EMC compliance requirement. It is important to refer valid test standards and customize it according to the needs. There are several factors in achieving expected measurement results to verify the usage of a target DUT (Device Under Test) in an EM environment. It starts from the test chamber selection and extends to EMI/EMC mitigation methods ranging from DUT application analysis, floor noise checks, proper grounding, deterring ripples and other circuit phenomena, EMI/EMC troubleshooting etc. While ensuring usage of valid test specifications and mitigation techniques, the performance of DUTs can be verified and released for field applications.

Presentation type

Poster

Primary author: Mr SHUKLA, ALOK (SEG Automotive (Formerly Bosch SG))

Presenter: Mr SHUKLA, ALOK (SEG Automotive (Formerly Bosch SG))

Contribution ID: **36** Type: **not specified**

RF over fiber based distributed RFI monitoring system

GMRT array consist of 30 antennas, 14 antennas are located in central square area of 1x1 km2 and remaining 16 antennas are arranged in Y-arm with longest baseline of 15 Kms. In today's growing world the astronomy is facing the problem of increased interference from the nearby places where the observatory is located. Sometimes it become cumbersome to manually identify the interference source in the area of 30 kms, therefore GMRT is developing distributed RFI monitoring system. RFoF technology enables a path for low loss signal transmission over longer distances, carry huge bandwidth of data, and is also immune to electrical noise. The paper discusses the technology, design, and methods for implementing it for distributed RFI monitoring for GMRT array.
This link with omnidirectional antenna at selected GMRT antenna site will carry locally present RFI near the antenna. Each arm will have 2 monitoring stations and 1 will be placed in center square, the data from the 7 stations will be recorded and processed in central processing station, we can develop algorithm to identify the location of interference source. This system will be helpful for studying interference like mobile signal, power line RFI, effects of Digital TV transmission police wireless etc. The designed system supports the frequency range from 10 to 3000 MHz, has inhouse designed low noise amplifier and has an optical link budget of 8 dB which will support an additional distance of 32 km at 1550 nm wavelength.

Presentation type

Oral

Primary authors: Mr RAI, Sanjeet (NCRA- TIFR); Mr SURESHKUMAR, S. (NCRA-TIFR)

Presenter: Mr RAI, Sanjeet (NCRA- TIFR)

Contribution ID: **37** Type: **not specified**

Characterization of a deep-depletion 4K x 4K CCD Detector System designed for ADFOSC

We present a detailed characterization of a CCD detector system developed for the ADFOSC instrument of the 3.6m DOT. During its development, various experiments were performed in a dark room to tune the CCD controller parameters to obtain optimum performance in single and four-port readout modes. We employed different methodologies for characterizing the performance parameters of the CCD, including bias stability, noise, defects, linearity, and gain. The CCD has grade-0 characteristics at temperatures close to operating temperature (-120°C). The overall system is linear with a regression coefficient of 0.9999, readout noise of 6 electrons and a gain value close to unity. We introduced a new method to calculate the dark signal using the gradient seen in the bias frames at temperatures below -35°C. Using the optimized setting, we verified the performance of the CCD detector system on-sky using the ADFOSC instrument mounted on 3.6m telescope. Later, we observed specific science targets and transients to evaluate the detector's performance in both imaging and spectroscopic modes.

Presentation type

Oral

Primary author: DIMPLE, Dimple (ARIES, Nainital)

Co-authors: Dr KUMAR, T. S. (ARIES); Dr OMAR, Amitesh (ARIES); Dr MISRA, Kuntal (ARIES)

Presenter: DIMPLE, Dimple (ARIES, Nainital)

Contribution ID: **38** Type: **not specified**

Optical design of thermal infrared imager for the SCALES on Keck

A third-generation Adoptive optics instrument named SCALES, Slicer Combined with Array of Lenslets for Exoplanet Spectroscopy, is being planned for commissioned on the W. M. Keck Observatory in near future. It has an integral field spectrograph (IFS) and a diffraction-limited infrared imaging channel to discover and spectrally characterize the directly imaged exoplanets. The imaging channel is intended to cover a rectangular field of 12′′ 12′′ and has minimal distortions, low wave-front error, and is highly telecentric as necessary for astrometry and high contrast imaging. It will operate in the wavelength band starting from near-infrared to mid-infrared (1-5 μm). In terms of capacity, it will be an improvement and substitute for the NIRC2. Additionally, the imaging channel images the pupil to aid the alignment process for pupil and cold stop. Further, the imaging camera would also assist in small field acquisition for IFS. Here we present the optical design, analysis and performances.

Presentation type

Oral

Primary author: HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Co-authors: BANYAL, Ravinder K. (Indian Institute of Astrophysics); SIVARANI, Thirupathi (Indian Institute of AStrophysics); VARSHNEY, Hari Mohan; PRAKASH, Ajin (Indian Institute of Astrophysics); KV, Govinda (IIAP); SURYA, Arun; SETHURAM, Ramya (Indian Institute of Astrophysics)

Presenter: HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Contribution ID: **39** Type: **not specified**

The conceptual design of high-resolution optical spectrograph for TMT

High-Resolution Optical Spectrograph (HROS) is one of the proposed second-generation seeing limited instruments on the Nasmyth platform of the Thirty Meter Telescope (TMT). It is a workhorse instrument for TMT in the wavelength band from UV to Near Infrared. We present a conceptual design of a high-resolution optical spectrograph for TMT. The design uses strategies of successful spectrographs (e.g., UVES, ESPRESSO) and incorporates constraints on the maximum available sizes of large optical components. The design offers large flexibility to choose several observing modes to meet the ambitious science goals of extremely large telescopes. HROS has spectral resolutions of R ~ 20,000-1,00,000 combined with a multi-object capability. The instrument design consists of two separate echelle spectrographs to cover the blue and red wavelengths. The combined red and blue spectrographs provide simultaneous wavelength coverage between 310 nm and 1000 nm. Both slit and the fibers inputs are available to meet the high throughput and high stability requirements. Here, we will present a detailed design of the spectrograph, Camera optics, telescope interface, and pre-slit optics and trade of between object selection in single object spectroscopy and multi-objects spectroscopy.

Presentation type

Oral

Primary author: HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Co-authors: T, Sivarani (Indian Institute of Astrophysics); S, Sriram; DIVAKAR, Devika; SETHURAM, Ramya (Indian Institute of Astrophysics); VARSHNEY, Hari Mohan; PRAKASH, Ajin (Indian Institute of Astrophysics)

Presenter: HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Contribution ID: **40** Type: **not specified**

Profilometry of large optical surfaces with under-sampled data using compressive sensing

Extremely large telescopes such as Thirty Meter Telescope (TMT) have their primary mirror as segments made of a large number of single mirrors. It is a challenge to polish such mirrors, especially the profilometry part. Surface profile measurements are taken at low, mid and high special frequencies. Obtaining highly accurate measurement data to cover the whole surface with contact and contactless methods is a challenge. Here we discuss a novel method to obtain the whole profile of the surface from under-sampled data. The compressive sensing algorithm utilizes sub-sampled data to reconstruct back the original surface. The algorithm is simulated and modelled on a 1.5-meter diameter mirror, the same that is used in TMT. A 2D profilometer is used to capture sampled data from the surface of this mirror and later is stitched to reconstruct the surface profile. Here we compare the results obtained after stitching as well as using a compressive sensing algorithm. This method can be extended towards the measurement of high special frequency data as well. We have simulated and modelled the surface from under-sampled high-frequency data as well. The results of the same are also discussed in detail along with the methodology followed in the algorithm

Presentation type

Poster

Primary authors: VALSAN, Vineeth (Christ University); Dr PANCHAL, Pramod (Indian Institute of Astrophysics); Mr BASHEER, Alikhan (Indian Institute of Astrophysics); Mr S, Sriram (Indian Institute of Astrophysics)

Presenter: VALSAN, Vineeth (Christ University)

Contribution ID: **41** Type: **not specified**

Low Noise Amplifier (LNA) for uGMRT band –II (110-250 MHz)

Radio Telescope Operating at Low Frequency suffer from various commercial transmission outside the observing band. Low Noise Amplifier being the first device to receive the Radio signals easily get saturated due to the out of band transmission and become impossible to carry out useful Radio Astronomical observation. The paper present a LNA design with for use in low cost 110 –250 MHz frequency range

Presentation type

Poster

Primary authors: Mr S., Sureshkumar (NCRA-TIFR); BHALERAO, Vilas (NCRA-TIFR)

Presenter: BHALERAO, Vilas (NCRA-TIFR)

Contribution ID: **42** Type: **not specified**

Recent Updates from the Expanded GMRT Aperture Array Beamformer Development

A 32-input, 32 MHz bandwidth, 5-beam, aperture array beamformer has been designed and implemented as part of the Expanded GMRT (eGMRT) proposal. This prototype beamformer development was a precursor to a wideband beamformer (300 MHz bandwidth) which is currently being designed. We present the basic architecture and the optimizations to implement these prototype correlator and beamformer designs on a single FPGA board. The beamformer has undergone testing in the free-space range at the GMRT site using the 144-element Vivaldi antenna array procured from ASTRON. Following the basic beamsteering tests, we performed optimum beamforming using the maxSNR method. The process of maxSNR beamforming takes in the array cross-correlation matrix as an input and provides beamformer weights that maximize the signal-to-noise ratio (SNR). We would explain this array calibration process on raw voltage (ADC output) data to understand the implementation of the maxSNR algorithm and to compare it with coherent beamforming using the conventional method. Further, we present results from 30-element maxSNR beamforming.

In parallel to this development, we have developed an end-to-end system simulation model on the MATLAB-Simulink platform for the prototype and its testing in the aperture array mode. We will provide a glimpse of comparing the simulated beamsteering pattern with the experimental one. Currently, we are implementing a wideband correlator and multi-beam beamformer on Xilinx RFSoC (RF System-on-Chip). We will discuss the initial results and implementation plans from this activity.

Presentation type

Oral

Primary authors: DIXIT, Bela (Giant Metrewave Radio Telescope (GMRT), NCRA-TIFR); BUCH, Kaushal (Giant Metrewave Radio Telescope, NCRA-TIFR)

Co-authors: Mr AJITHKUMAR, B. (Giant Metrewave Radio Telescope, NCRA-TIFR); Prof. CHENGALUR, Jayaram (National Centre for Radio Astrophysics, TIFR)

Presenters: DIXIT, Bela (Giant Metrewave Radio Telescope (GMRT), NCRA-TIFR); BUCH, Kaushal (Giant Metrewave Radio Telescope, NCRA-TIFR)

Contribution ID: **43** Type: **not specified**

1.3m Telescope Current Status and Future Up gradation Plans

1.3m Telescope Current Status and Future Up gradation Plans

Mukeshkumar Jaiswar 1, TS Kumar 1 and Shobhit Yadav 1

1 ARIES, Manora Peak, Nainital-263001

Corresponding Author(s): mukesh@aries.res.in, kumar@aries.res.in

Abstract: 1.3m DFM Telescope has been installed at ARIES Devasthal site in the year 2010. It is more than 10 Years old telescope most of its component has been obsoleted and for smooth functioning of telescope it requires future up gradation. Initially, we would like to start with Its RA and DEC motion up gradation. DFM has provided analog card based PID controller to control RA and DEC motion in 1.3m telescope and It has Galil Controller and it is has manual tuning (Pot Based) method to achieve performance. It will be upgraded with Omron CK3M based industrial grade controller. Laboratory based motion test setup has been developed and is being utilized for evaluating CK3M controller.

Presentation type

Oral

Primary authors: JAISWAR, Mukeshkumar (bachelor of engineering in Electronics and Telecommunication); T. S., Kumar (ARIES)

Co-author: YADAVA, shobhit (ARIES Nainital - 263001)

Presenters: JAISWAR, Mukeshkumar (bachelor of engineering in Electronics and Telecommunication); T. S., Kumar (ARIES)

Contribution ID: **44** Type: **not specified**

Structural Design and Finite Element Analysis of Wide Field Optical Spectrograph (WFOS)

The Wide Field Optical Spectrometer (WFOS) is an instrument under development for the first-light operation of the Thirty Meter Telescope (TMT), which will provide high throughput across the entire wavelength range of 310-1000 nm, including the extreme blue and red wavelengths. WFOS is positioned on the Nasmyth platform of TMT and measures ~6m x 6m x 6m in size. The total mass is around 40 tonnes and requires precise positioning of optomechanical sub-systems within the instrument throughout it lifetime (>50 years).

The mechanical design of the structure plays an important role in the overall design of the instrument as the structure must ensure that the optics are kept in place, all instruments must be accessible for adjustments during alignment, effects due to temperature variation are minimal etc., all for lowest possible cost while providing the maximum possible performance. The WFOS structure has a static part as well as a rotating part which adds to the complexity in design.

The structure must also not undergo any sort of mechanical failure due to the different loads such as gravitational acceleration, vibrations, seismic activity etc. To understand the structural static and dynamic characteristics and to optimize the design finite element analysis (FEA) is used.

In this talk we shall discuss the design approach, various loadcases and other considerations taken into account in the structural design of WFOS.

Presentation type

Oral

Primary authors: PRAKASH, AJIN (Indian Institute of Astrophysics); KV, Govinda (IIAP); Mr NASH, Reston (California Institute of Technology); SETHURAM, Ramya (Indian Institute of Astrophysics); KAMBHALA, SUDHARSAN; VARSHNEY, Hari Mohan; T, Sivarani (Indian Institute of Astrophysics)

Presenter: PRAKASH, AJIN (Indian Institute of Astrophysics)

Contribution ID: **45** Type: **not specified**

Design of WFOS Camera Rotation System for TMT

Wide Field Optical Spectrograph (WFOS) is designed to provide large flexibility in observing modes to maximize the science capability. Imaging and several spectroscopic modes are available along with the choice of wavelength coverage at optimal efficiency by changing the grating angle. In order to achieve this, the camera also rotates to follow the grating. The opto-mechanical layout of the instrument allows a stable mounting of Camera Rotation System (CRS) on an optical bench and camera rotation in the gravity invariant direction that would minimize variable flexure introduced to the camera system.
CRS provides a stable mounting platform for the Camera lens assembly, Detector cryostat assembly, Filter exchange system and a rotation mechanism for the whole assembly about the grating rotation axis. The entire assembly is supported on the instrument optical bench. The main requirement of Camera rotation system should facilitate precise positioning at all observing modes and provide stable mounting interface that does not add further degradation to the standalone performance of camera and detector assembly and the rotation mechanism need to meet the positional accuracy (anywhere between 0 to 100 degrees) and stability needs for science requirement for the life of about 50 years.

Configuration and the Design of the Camera Rotation System for WFOS will be presented in the talk.

Presentation type

Poster

Primary author: KAMBHALA, SUDHARSAN

Co-authors: PRAKASH, AJIN (Indian Institute of Astrophysics); KV, Govinda (IIAP); VARSHNEY, Hari Mohan; T, Sivarani (Indian Institute of Astrophysics); Mr NASH, Reston (California institute of technology); DIVAKAR, Devika; SETHURAM, Ramya (Indian Institute of Astrophysics); NIGAM, Vaishaly; HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Presenter: KAMBHALA, SUDHARSAN

Contribution ID: **46** Type: **not specified**

Astrometric and photometric standard candidates for the upcoming 4-m ILMT survey

The International Liquid Mirror Telescope (ILMT) is a 4-meter class survey telescope that has recently achieved first light and is expected to swing into full operations by 1st January 2023. It scans the sky in a fixed 22′ wide strip centered at the declination of 29°21′41′′ and works in Time Delay Integration (TDI) mode. We present a full catalog of sources in the ILMT strip that can serve as astrometric calibrators. The characteristics of the sources for astrometric calibration are extracted from Gaia EDR3 as it provides a very precise measurement of astrometric properties such as RA (α), Dec (δ), parallax (π), and proper motions ($\mu\alpha*$ & μδ). We have crossmatched the Gaia EDR3 with SDSS DR17 and PanSTARRS-1 (PS1) and supplemented the catalog with apparent magnitudes of these sources in g, r, and i filters. We also present a catalog of spectroscopically confirmed white dwarfs with SDSS magnitudes that may serve as photometric calibrators. The catalogs generated are stored in a SQLite database for query-based access. We also report the offsets in equatorial positions compared to Gaia for an astrometrically calibrated TDI frame observed with the ILMT.

Presentation type

Poster

Primary authors: DUKIYA, Naveen (ARIES Nainital); Mrs MISRA, Kuntal (ARIES, Nainital); Mr PRADHAN, Bikram (ISRO Headquarters)

Co-authors: Ms AILAWADHI, Bhavya (ARIES, Nainital); Mr KUMAR, Brajesh (ARIES, Nainital); Mr NEGI, Vibhore (ARIES, Nainital); Mr HICKSON, Paul (Department of Physics and Astronomy, University of British Columbia); Mr SURDEJ, Jean (Space sciences, Technologies and Astrophysics Research (STAR) Institute, Universit´e de Li‘ege)

Presenter: DUKIYA, Naveen (ARIES Nainital)

Contribution ID: **47** Type: **not specified**

Conceptual design of M2/M3 Coating Plant for TMT

The Thirty Meter Telescope (TMT) is a joint venture of scientific institutions in Canada, China, India, Japan and the US to build a 30-m diameter optical–infra-red telescope. As part of India's contribution, the India-TMT Coordination Centre (ITCC) is developing various sub-systems needed for the telescope in collaboration with Indian industrial partners. The TMT will be a Ritchey-Chrétien telescope with the primary mirror consisting of 492 smaller (1.44-m) individual hexagonal mirror segments and a secondary (M2) and a Tertiary (M3) mirrors of 3.65-m and ~3.6-m in diameter respectively. With the intention to design, built and commission a coating plant for applying appropriate coating on the M2 and M3 mirrors, a conceptual design study was conducted recently. In this talk I will discuss about the key requirements that drove the design choice and explain how the design has been optimized to satisfy those requirements.

Presentation type

Oral

Primary author: GOPINATHAN, Maheswar (Indian Institute of Astrophysics)

Presenter: GOPINATHAN, Maheswar (Indian Institute of Astrophysics)

Contribution ID: **48** Type: **not specified**

Design of Lenslet Array Mount for Thermal Stability and Athermalisation in SCALES

Slicer Combined with Array of Lenslets for Exoplanet Spectroscopy (SCALES) is an infrared instrument for Keck-II, being built by a consortium including UC Santa Cruz, UC Irvine, UCLA, the Indian Institute for Astrophysics, Keck Observatory, and Caltech. SCALES will have an Integral Field Spectrograph (IFS) to characterize the planetary atmosphere and a high-contrast Imaging Channel to detect exoplanets.
Its fully cryogenic optical train uses a custom silicon lenslet array, selectable coronagraphs, and dispersive prisms to carry out integral field spectroscopy over a 2.2 arcsec field of view at Keck with low spectral resolution (< 300). The instrument uses a lenslet array to sample a 2D field, and then prism and gratings to disperse the lenslet spots into individually separable spectra. The lenslet array itself is supplied from a vendor with a silicon "picture frame"for mounting on the spectrograph bench. The Lenslet Array consists of a number of lenslets arranged in an order forming a rectangular solid element. The Lenslet Array is to be fixed in the SCALES system that operate at cryogenic temperature. In this poster we show the design of the mount for fixing the Lenslet Array in the SCALES system.

Presentation type

Poster

Primary authors: Mr PRAKASH, Ajin (Indian Institute of Astrophysics); Mr KV, Govinda (IIAP); Prof. BANYAL, Ravinder K. (Indian Institute of Astrophysics); Mr VARSHNEY, Hari Mohan; Dr SETHURAM, Ramya (Indian Institute of Astrophysics); Prof. T, Sivarani (Indian Institute of Astrophysics)

Presenter: Mr PRAKASH, Ajin (Indian Institute of Astrophysics)

Contribution ID: **49** Type: **not specified**

Parabolic reflector antenna optimization for better G/Tsys

The antenna aperture efficiency is a recurrence of illumination efficiency (or taper efficiency) and spillover efficiency and phase efficiency. The illumination efficiency depends on the taper of the feed and spillover depends on after taper how the radiation pattern falls and also the back lobes. Similarly, the ground temperature mostly depends on spillover temperature. The objective of this work is to form the antenna radiation pattern and how it will affect the aperture efficiency and ground temperature and also, we will give a glimpse of how we will improve the aperture efficiency and ground temperature by changing the radiation pattern with a given FOD (focal length/diameter). The work is carried out by using RASCAL software which was previously given a very good argument between computed and measured sensitivity.

Presentation type

Poster

Primary authors: CHATTERJEE, Sougata (NCRA-TIFR); S., Sureshkumar (NCRA-TIFR)

Presenters: CHATTERJEE, Sougata (NCRA-TIFR); S., Sureshkumar (NCRA-TIFR)

Contribution ID: **50** Type: **not specified**

Three stage Low Noise Amplifier (LNA) design for G/Tsys improvement in L band

G/Tsys is define the ratio of gain (K/Jy) and the system temperature. The system temperature (Tsys) depends on ground temperature, sky temperature, and receiver temperature. Receiver temperature primarily depends on the noise of the low noise amplifier (LNA). The objective of this work is to design a three-stage LNA in the L band (1 GHz-1.7 GHz) with a noise temperature of less than 40 K and increased gain of 45 dB. The ATF-54143 (HEMT) is used as a device for designing this LNA. The first stage and second stage of the LNA minimize the noise with a compromise of its gain whereas in the third stage we improve the gain so that overall gain is maintained. The dynamic range of the LNA was taken care by reducing the gain on the first and second stage and improved the gain the third stage. The LNA is installed in the GMRT antenna and studied its performance. The new LNA shows improved sensitivity compared to our existing LNA.

Presentation type

Poster

Primary authors: RAUT, Anil (NCRA-TIFR, Pune); CHATTERJEE, Sougata (NCRA-TIFR)

Presenters: RAUT, Anil (NCRA-TIFR, Pune); CHATTERJEE, Sougata (NCRA-TIFR)

Track Classification: Antenna and RF

Contribution ID: **51** Type: **not specified**

Initial Developments in the TPM Beamformer Activity at GMRT

Giant Metrewave Radio Telescope (GMRT) is a member of the Low Frequency Aperture Array (LFAA) consortium of the Square Kilometer Array group in India (SKA-India). SKA-Low would operate in a frequency range of 50-350 MHz and utilises an array of log-periodic antennas. 256 numbers of such Log-periodic antennas are used at each station, the signal from these antennas are processed to form beams which are further transported to a central processing room. The signal processing in LFAA would be carried out using Tile Processing Module (TPM), which is a FPGA-based hardware board for implementing beamforming system developed by the Italian collaborators. GMRT Backend team is currently involved in setting up the TPM and its control machine, testing beamformer design functionality using Aperture Array Verification System (AAVS) software, validating results, identifying possible bugs in the AAVS and fixing them. We are currently involved in the characterization of system components to achieve performance, identifying possible testing procedures to test part of the beamformer (particularly the phase correction and calibration modules). At present, the TPM is being tested using the RF test setup, however , in future, we plan to test the TPM hardware with the antenna signals. In parallel with these activities, we plan to add a real-time Radio Frequency Interference (RFI) mitigation block to the TPM beamformer signal processing chain. As an initial effort, we have developed a technique similar to that used for mitigating RFI in real-time in the Upgraded GMRT (uGMR T) backend. In this poster, we provide an introduction to the SKA beamformer activities being done in the GMRT labs and present initial results from the functional simulation of the RFI filter design.

Presentation type

Poster

Primary authors: KUMAR, Ajith (NCRA-TIFR, Pune); HALAGALI, Irappa (GMRT); BHONDE, Indukumar (GMRT, NCRA-TIFR); BUCH, Kaushal (Giant Metrewave Radio Telescope, NCRA-TIFR); MULEY, Mekhala (GMRT, NCRA-TIFR); CHAUDHARI, Sandeep (NCRA-TIFR, Pune); PHAKATKAR, Sudhir (GMRT, NCRA - TIFR)

Presenter: HALAGALI, Irappa (GMRT)

Contribution ID: **52** Type: **not specified**

Welcoming Remarks

Presenter: Prof. SUBRAMANIAM, Annapurni (IIA)

Contribution ID: **53** Type: **not specified**

Welcoming Remarks

Wednesday, September 14, 2022 9:00 AM (10 minutes)

Presenter: Prof. SUBRAMANIAM, Annapurni (IIA)

Session Classification: Welcome and Plenary

Contribution ID: **54** Type: **not specified**

Key Note Address

Wednesday, September 14, 2022 9:10 AM (40 minutes)

Presenter: Prof. GUPTA, Yashwant (NCRA-TIFR, Pune)

Session Classification: Welcome and Plenary

Contribution ID: **55** Type: **not specified**

Touching Infinity, the JWST Mirror Makers

Wednesday, September 14, 2022 9:50 AM (40 minutes)

Presenter: COLE, Glen (TIO)

Session Classification: Invited Talks

Contribution ID: **56** Type: **not specified**

Visible Emission Line Coronagraph on-board Aditya L1 : Engineering Challenges

Wednesday, September 14, 2022 10:30 AM (40 minutes)

Presenter: Prof. B, Raghavendra Prasad (Indian Institute of Astrophysics)

Session Classification: Invited Talks

Contribution ID: **57** Type: **not specified**

Mechanical Design Aspects of INSIST Project

Wednesday, September 14, 2022 11:30 AM (20 minutes)

Presenter: Dr S, Nagabhushana (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **58** Type: **not specified**

NLST Project

Wednesday, September 14, 2022 11:50 AM (20 minutes)

Presenter: Dr B, Ravindra (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **59** Type: **not specified**

SCALES Project

Wednesday, September 14, 2022 12:10 PM (20 minutes)

Presenter: Dr BANYAL, Ravinder K. (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **60** Type: **not specified**

Primary Mirror Control Systems (M1CS) of the Thirty Meter Telescope (TMT) Project

Wednesday, September 14, 2022 12:30 PM (20 minutes)

Presenter: Dr DESHMUKH, Prasanna (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **61** Type: **not specified**

Conceptual design of M2/M3 Coating Plant for TMT

Wednesday, September 14, 2022 12:50 PM (20 minutes)

Presenter: Dr GOPINATHAN, Maheswar (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **62** Type: **not specified**

Navigation Systems for Aero space Applications

Wednesday, September 14, 2022 2:00 PM (30 minutes)

Presenter: PRASAD, Shiv (DRDL)

Session Classification: Session

Contribution ID: **63** Type: **not specified**

Overview of GMRT Antenna Feed Upgrade : Current and Future Works

Wednesday, September 14, 2022 2:30 PM (15 minutes)

Presenter: BANDARI, HANUMANTH RAO (TATA INSTITUTE OF FUNDAMENTAL RESEARCH)

Session Classification: Session

Contribution ID: **64** Type: **not specified**

FPGA Accelerated Cross Correlation of Digital Images: Application to Solar Adaptive Optics

Wednesday, September 14, 2022 2:45 PM (15 minutes)

Presenter: DAS, Soham

Session Classification: Session

Contribution ID: **65** Type: **not specified**

Recent Updates from the Expanded GMRT Aperture Array Beamformer Development

Wednesday, September 14, 2022 3:00 PM (15 minutes)

Presenter: DIXIT, Bela (Giant Metrewave Radio Telescope (GMRT), NCRA-TIFR)

Session Classification: Session

Contribution ID: **66** Type: **not specified**

Characterization of a deep-depletion 4K x 4K CCD Detector System designed for ADFOSC

Wednesday, September 14, 2022 3:15 PM (15 minutes)

Presenter: DIMPLE, Dimple (ARIES, Nainital)

Session Classification: Session

Contribution ID: **67** Type: **not specified**

Optics Fabrication

Wednesday, September 14, 2022 4:00 PM (30 minutes)

Presenter: KRISHNA, Rama (Optics & Allied Engg. Pvt. Ltd.)

Session Classification: Session

Contribution ID: **68** Type: **not specified**

Aluminizing the Primary Mirrors of Telescopes in ARIES

Wednesday, September 14, 2022 4:30 PM (15 minutes)

Presenter: REDDY, Krishna (ARIES)

Session Classification: Session

Contribution ID: **69** Type: **not specified**

The conceptual design of high-resolution optical spectrograph for TMT

Wednesday, September 14, 2022 4:45 PM (15 minutes)

Presenter: HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Session Classification: Session

Contribution ID: **70** Type: **not specified**

Optomechanical design and analysis of SING spectrograph

Wednesday, September 14, 2022 5:00 PM (15 minutes)

Presenter: GOPALAKRISHNAN, Binukumar (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **71** Type: **not specified**

Optical design of thermal infrared imager for the SCALES on Keck

Wednesday, September 14, 2022 5:15 PM (15 minutes)

Presenter: HASAN, Amirul (Indian Institute of Astrophysics Bangalore)

Session Classification: Session

Contribution ID: **72** Type: **not specified**

Assessing the Performance of a Digital Micromirror Device (DMD) based Multi-Object Spectrograph (MOS) for the Indian Spectroscopic and Imaging Space Telescope (INSIST)

Wednesday, September 14, 2022 5:30 PM (15 minutes)

Presenter: HOODATI, ANWESHA (INDIAN INSTITUTE OF ASTROPHYSICS)

Session Classification: Session

Contribution ID: **73** Type: **not specified**

Full Stokes Polarimeter for Characterization of Retarders

Wednesday, September 14, 2022 5:45 PM (15 minutes)

Presenter: DVS, Phanindra (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **74** Type: **not specified**

Industry 5.0-personal Musings

Thursday, September 15, 2022 9:05 AM (40 minutes)

Presenter: Prof. G, Jagadish (Centre for Excellence in Hypersonics; Aerospace Engineering Dept, IISc)

Session Classification: Plenary Session & Invited Talks

Contribution ID: **75** Type: **not specified**

Challenges in Electro Optical Systems Development for Space Missions

Thursday, September 15, 2022 9:45 AM (40 minutes)

Presenter: Dr RAO, Nagendra (Ex Centre Director, LEOS)

Session Classification: Plenary Session & Invited Talks

Contribution ID: **76** Type: **not specified**

Astrophotography

Thursday, September 15, 2022 10:25 AM (20 minutes)

Presenter: ANGCHUK, Dorje (IIA)

Session Classification: Plenary Session & Invited Talks

Contribution ID: **77** Type: **not specified**

Porous Nano Materials for Advanced Applications

Thursday, September 15, 2022 11:00 AM (30 minutes)

Presenter: Prof. HEBBAR, Gurumoorthi (Christ University)

Session Classification: Session

Contribution ID: **78** Type: **not specified**

Upgradation in the Filter slide motion mechanism for 1.3m DFOT

Thursday, September 15, 2022 11:30 AM (15 minutes)

Presenter: BANGIA, Tarun (ARIES)

Session Classification: Session

Contribution ID: **79** Type: **not specified**

Preliminary Design of Imager Filter Wheel Mechanism (IFWM) for Keck Observatory SCALES Instrument

Thursday, September 15, 2022 11:45 AM (15 minutes)

Presenter: VARSHNEY, Hari Mohan

Session Classification: Session

Contribution ID: **80** Type: **not specified**

Structural Design and Finite Element Analysis of Wide Field Optical Spectrograph (WFOS)

Thursday, September 15, 2022 12:00 PM (15 minutes)

Presenter: PRAKASH, AJIN (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **81** Type: **not specified**

Mechanical Engineering & modern Observational Science - with emerging Manufacturing Technology

Thursday, September 15, 2022 12:15 PM (15 minutes)

Presenter: CHAKRABORTY, PRADIP (Aryabhatta Research Institute of Observational Sciences(ARIES),Nainital,Uttarakhan

Session Classification: Session

Contribution ID: **82** Type: **not specified**

Design & Development of Grating Exchanger (GRX) for TMT-Wide Field Optical Spectrograph

Thursday, September 15, 2022 12:30 PM (15 minutes)

Presenter: VARSHNEY, Hari Mohan

Session Classification: Session

Contribution ID: **83** Type: **not specified**

Balloon-borne Payload Module: Collection of Micrometeorite Dust at High Altitudes in Earth's Atmosphere

Thursday, September 15, 2022 12:45 PM (15 minutes)

Presenter: ARORA, Diksha

Session Classification: Session

Contribution ID: **84** Type: **not specified**

Best Grounding practices

Thursday, September 15, 2022 2:00 PM (30 minutes)

Presenter: C, Prabhakar (High Voltage Division (HVD) Central Power Research Institute)

Session Classification: Session

Contribution ID: **85** Type: **not specified**

Astrometric and photometric standard candidates for the upcoming 4-m ILMT survey

Thursday, September 15, 2022 2:30 PM (15 minutes)

Presenter: DUKIYA, Naveen (ARIES Nainital)

Session Classification: Session

Contribution ID: **86** Type: **not specified**

1.3m Telescope Current Status and Future Up-gradation Plans

Thursday, September 15, 2022 2:45 PM (15 minutes)

Presenter: JAISWAR, Mukeshkumar (bachelor of engineering in Electronics and Telecommunication)

Session Classification: Session

Contribution ID: **87** Type: **not specified**

A portable, low-cost multispectral system for monitoring night sky brightness over the astronomical sites

Thursday, September 15, 2022 3:00 PM (15 minutes)

Presenter: KUMAR, Ashish (ARIES)

Session Classification: Session

Contribution ID: **88** Type: **not specified**

Upgradation of integral auto guider unit subsystem of the 3.6 m DOT

Thursday, September 15, 2022 3:15 PM (15 minutes)

Presenter: T.S., Kumar (Aryabhatta Research Institute of Observational Sciences, INDIA)

Session Classification: Session

Contribution ID: **89** Type: **not specified**

The 50cm Robotic Telescope: Control System Upgrade and Automation

Thursday, September 15, 2022 4:00 PM (15 minutes)

Presenter: STANZIN, Tsewang

Session Classification: Session

Contribution ID: **90** Type: **not specified**

RF over fiber based distributed RFI monitoring system

Thursday, September 15, 2022 4:15 PM (15 minutes)

Presenter: RAI, Sanjeet (NCRA- TIFR)

Session Classification: Session

Contribution ID: **91** Type: **not specified**

Real-time Broadband RFI Filtering System for uGMRT: Overview of the Released System and Future Plans

Thursday, September 15, 2022 4:30 PM (15 minutes)

Presenter: BUCH, Kaushal (Giant Metrewave Radio Telescope, NCRA-TIFR)

Session Classification: Session

Contribution ID: **92** Type: **not specified**

Multi-Element Correlator & Beam former using Open CL on FPGA Accelerator Card

Thursday, September 15, 2022 4:45 PM (15 minutes)

Presenter: HOMBAL, Raghuttam (Savitribai Phule Pune University)

Session Classification: Session

Contribution ID: **93** Type: **not specified**

Electronics subsystem development of SING spectrograph payload

Thursday, September 15, 2022 5:00 PM (15 minutes)

Presenter: CHANDRA, Bharath (Indian Institute of Astrophysics)

Session Classification: Session

Contribution ID: **94** Type: **not specified**

Felicitation to Mr.Dorje Angchuk for Honorary Member of the IAU

Thursday, September 15, 2022 6:00 PM (5 minutes)

Session Classification: Session

Contribution ID: **95** Type: **not specified**

Engineer's Day Talk

Thursday, September 15, 2022 6:05 PM (40 minutes)

Presenter: S, Somanath (ISRO)

Session Classification: Session

Contribution ID: **96** Type: **not specified**

"RAAG-HARMONY"by Ateetam and Musical Programme by IIA Family

Thursday, September 15, 2022 6:45 PM (1h 30m)

Session Classification: Session

Contribution ID: **97** Type: **not specified**

Trip to Gauribidanur (GBD) Radio Observatory (Starting Point: IIA, Koramangala)

Friday, September 16, 2022 7:00 AM (2 hours)

Contribution ID: **98** Type: **not specified**

Visit to GBD Radio Telescope facilities

Friday, September 16, 2022 10:00 AM (2h 30m)

Contribution ID: **99** Type: **not specified**

Visit to RRI Facilities

Friday, September 16, 2022 1:30 PM (2 hours)

Contribution ID: **100** Type: **not specified**

Departure from GBD and arrival to IIA Bangalore, Conference closure

Friday, September 16, 2022 4:00 PM (2h 30m)

Contribution ID: **101** Type: **not specified**

Engineer's Day & It's significance

Thursday, September 15, 2022 9:00 AM (5 minutes)

Presenter: PANANGATTUKARA, Mahesh (Indian Institute of Astrophysics, Bangalore 560034)

Session Classification: Plenary Session & Invited Talks