



ನಿಸರ್ಗ NISARGA

Newsletter from
Manipal Centre for Natural Sciences

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Issue – 2

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EDITOR'S VOICE

Nisarga is now two issues old! As it has grown from the first to the second, the strength of MCNS has more than doubled! This is true individually for each department of MCNS. Specifically, the physics group, involved in astronomy, theoretical physics, particle physics, nuclear physics, etc. has formed a potentially formidable team, with esteemed collaborators and reputed advisors being part of it. The teams committed to the earth and planetary sciences, computational chemistry, and evolutionary botany also have already shown their potential by significant performances in this period. A brief report herein by our Director under 'Director Speaks' gives an account of the developments in the Centre. Also, the profiles of the new-comers, the list of important events, the list of publications, the details of achievements, etc., given in this issue together showcase the growth of the Centre in the last half year.

Dr. Shalima, in her scientific article, describes how significant the study of the craters in the asteroid 'Ryugu' is, in the understanding of the formation of a planet and life in it. The scientific methodologies used to know the role of impacting objects, that create these craters, is interesting.

Science-day celebration, as a week-long program, is among the most significant event in this half-year, wherein the fond memory of the Nobel Laureate Sir C V Raman was celebrated with the participation of several Indian scientists of international repute, along with MCNS experts. You see a short report here, where you must note that the talks were shared through MS Teams platform for the participants and through YouTube for others interested.

Every issue of Nisarga will touch upon the Summer Research Internship program, cherished as the flagship program of the Centre, as the six-week event in June-July shares both the halves in a year. This year, SRI-2022, had cream as the interns, selected from many applicants, and is heading to bring out the high-quality researchers in these young aspirants.



This issue also presents nutshell details of the academic programs, scientific activities, achievements, and social interactions, etc. of MCNS in the half year.

MCNS, a Centre totally committed to fundamental research in natural sciences, benefits from the constant support from MAHE, and, also from the periodical progress-assessments by the Directorate of Research (DOR). MCNS owes its growth to the Advisors' group and shares its pride with other MAHE units contributing to the A++ ranking of MAHE given by the highest accreditation body of India.

Let us meet again with greetings for the New Year in 2023!

Dr. V. Gopalakrishnan

DIRECTOR SPEAKS

It is indeed a pleasure to me to release the 2nd issue of our newsletter, viz. Nisarga, not just because it indicates continuation of an effort that began, but because I have new things to say! In the first issue released in January, 2022, our respectable Vice Chancellor had noted, *"MCNS being an 'all-research' Centre, and a Centre of Excellence, the expected targets and quality are among the highest."* That sets the driving force behind our earnest

efforts in our commitment to doing fundamental research in various fields of natural sciences.

In the last six months, MCNS has inducted 10 researchers in its manpower, from the fields of astronomy/astrophysics, particle physics/theoretical physics, nuclear physics, and earth sciences including geology and evolution botany. MCNS 'Advisory Team' comprising of senior scientists of international repute, helped our own expert faculty in selecting highly promising researchers from the applicants. I am happy to say that these new-comers have already shown their skills through publications, and participations in national and international scientific events.



Dr. M. Prithviraj

The recent spurt in the online interactions, partly an offshoot of the covid pandemic, is set to stay and grow! MCNS sees a significant enhancement in its scientific interactions with national and international experts, and benefits from their participation in events, small or big. The effect was visible this half-year, especially during the Science Day celebrations and the Summer Research Internship (SRI-

2022) program. Of late, the number of applicants/participants for MCNS events has increased manifold. Some of these events are live telecast through YouTube medium for the benefit of those of the public that are interested. MCNS is contemplating on producing online courses too, and has begun doing the spade-work.

The Science Day event was very special in this period. It was celebrated for a week, and accomplished scientists at the levels of directors, vice-chancellors, etc. of top-class national institutions participated and gave expert talks. MCNS experts also gave talks on very important topics of common interest.

The SRI-2022 program this year, attracted about 700 applications from all over India and from abroad, from which 15 meritorious interns were selected to do a 6-week research project on a contemporary topic each, under the guidance of an expert mentor. MAHE supports the travel, stay in hostels, etc., of the participants financially. The event will conclude in July with the top three performers rewarded.

The workshop on "plant inventory methods," ostensibly one of the core field-based programmes, was successfully organized online with 140 participants from across India. The workshop featured seven technical sessions led by highly qualified experts in Botany, Ecology, and Biodiversity.

The spirit of service to humanity is expressed through our outreach programs, performed under the aegis of the TMA Pai Planetarium through our daily planetarium shows that help the viewers, viz., the general public and students, wonder at the way science describes, appreciates and enjoys Nature's beauty. Another way of our outreach is our 1-week short certificate course, which is given free of cost, to college-level students and life-long learners. This year we offered 5 courses, in the fields of botany, geology, chemistry, nuclear physics and solar physics, each one tuned to impart some specific skills in the dedicated participants.

As described in the first issue, MCNS is committed to fundamental research in several branches of natural sciences. However, the Centre does learn from world experts on the one side, and does teach the young aspirants and the public on the other. Several new programs, academic and professional, are in the pipeline, to start. MCNS will continue doing its best to maintain the highly accredited MAHE's reputation as an Institution of eminence (IOE).

Dr. M. Prithviraj, (I/C) Director, MCNS

SCIENTIFIC ARTICLE

Clues to the origin of life on Earth from the primitive asteroid Ryugu

According to current theories of planet formation, terrestrial planets are formed by the sticking together of Planetesimals – the building blocks of planets – which are themselves the aggregates of sub-micron sized dust grains. Asteroids that mostly occupy the region between Mars and Jupiter in the Solar system are the evolved remnants of planetesimals and therefore a crucial link in the planet formation process. Among the different types of asteroids, C-type asteroids are the most pristine and retain most of the organic material and water pertaining to the early solar system in their sub-surface layers. Hence there is considerable interest in studying primitive Near Earth asteroids like 162173 Ryugu (Figure 1), which is a Cb-type asteroid with a mean radius of 448.2m.

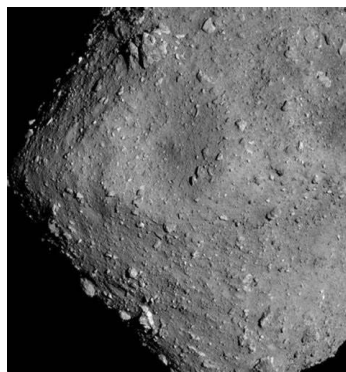


Figure 1: Asteroid Ryugu
(Hayabusa 2, JAXA)

Ryugu was the target of the Hayabusa 2 mission of JAXA, Japan (S. Tachibana et al. 2014), that was aimed at retrieving surface and sub-surface samples from the asteroid and bringing them to the Earth for detailed laboratory analysis. This mission was launched in 2014. During its first touchdown on Ryugu, surface samples were collected. Later in 2019, an artificial impact crater was created using the SCI 2kg impactor. The impact excavated sub-surface material from the asteroid in the form of an ejecta curtain (Figure 2). The apparent diameter of the crater was 14.5m. The samples collected from the sub-surface material, together with the surface samples were returned to Earth in December 2020.

Apart from laboratory analysis of the returned samples, in-situ observations of the ejecta curtain were performed in the visible range by the DCAM3 camera on board Hayabusa 2 (see Figure 2). When sunlight falls on the ejecta curtain, it is scattered by the tiny dust grains in the

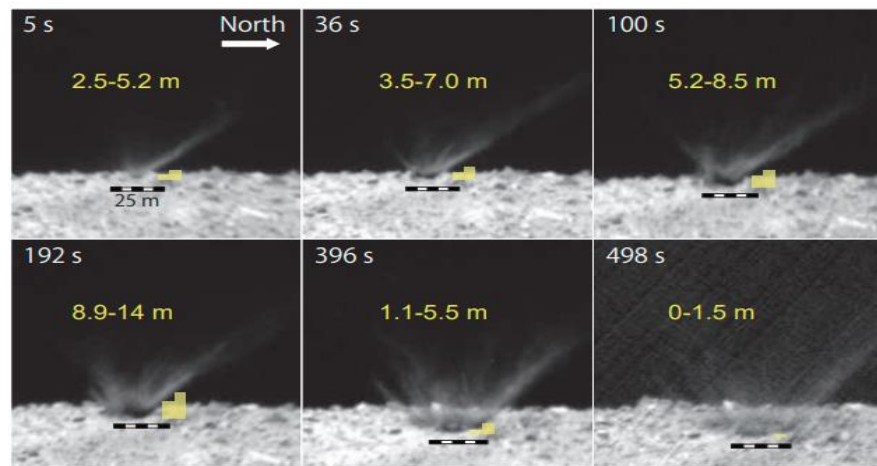


Figure 2: DCAM3 image of the ejecta curtain produced by SCI impactor (Wada et al. 2021)

ejecta and an analysis of the scattering properties of these grains can be instrumental in deriving the particle size distribution and optical properties like the single scattering albedo and phase function. These properties reflect the evolution of the surface and the physical processes that have taken place in the asteroid. These properties can then be verified using the laboratory data, which is a major advantage of the Hayabusa 2 mission, compared to most other planetary missions.

Several possible grain models were considered for the ejecta curtain and the corresponding intensities predicted. This included grains that are typical of the interstellar medium (ISM), cometary grains and even larger aggregate grains. These aggregate grains are usually observed in lunar regolith and the surfaces of other minor planetary bodies. Figure 3. shows the predicted scattered intensities of one such model corresponding to aggregate grains (left panel) and typical ISM grains (right panel).

It is evident that the intensities of the aggregate grains are much higher compared to ISM type grains. Whether the actual composition of Ryugu sub-surface grains is similar to any of the grain types mentioned here can be ascertained only from detailed modelling

of the observed intensities. Initial analysis of the scattered intensities has revealed that the grains are aggregates having sizes of the order of a few millimeters (Wada et al. 2021).

The samples returned from Ryugu is currently being analysed and have already started giving us exciting results. It is observed that the Ryugu soil composition is similar to CI chondritic meteorites with composition close to the Sun's photosphere, but fluffier and more porous with a lower albedo (Yurimoto et al. 2022, Yada et al. 2022, T. Yokoyama et al. 2022, T. Nakamura et al. 2022). It was seen that the material in the asteroid has undergone aqueous alteration and has not been subject to temperatures greater than 100 K (T. Nakamura et al. 2022). The most exciting discovery that



has been announced recently is that of nearly 23 different amino acids including glycine and Beta-alanine, polycyclic aromatic hydrocarbons similar to terrestrial petroleum, and various nitrogen compounds in the soil of Ryugu (e.g. Naraoka et al. 2022). The presence of these prebiotic organic compounds in one of the most primitive samples from our Solar system, can tell us about how life evolved on planet Earth and from where the raw materials necessary for life to originate came from. This discovery strengthens the hypothesis that asteroid and comet impacts brought the essential organic molecules to Earth.

Dr. Shalima Puthiyaveetil, Assistant Professor, MCNS

References

1. Hayabusa2: Scientific importance of samples returned from C-type near-Earth asteroid (162173) 1999 JU₃, S. Tachibana et al., 2014, *Geochem. J.***48**, 571–587
2. Size of particles ejected from an artificial impact crater on asteroid 162173 Ryugu, Wada et al., 2021, *A & A*, 647, A43
3. Preliminary analysis of the Hayabusa2 samples returned from C-type asteroid Ryugu, Yada et al., 2022, *Nature Astronomy*, 6, 214
4. Samples returned from the asteroid Ryugu are similar to Ivuna-type carbonaceous meteorites, T. Yokoyama et al., 2022, *Science*, First release
5. Early history of Ryugu's parent asteroid: evidence from return sample, T. Nakamura et al., 2022, 53rd Lunar and Planetary Science Conference (2022)
6. Soluble organic compounds in asteroid 162173 Ryugu, H. Naraoka et al., 2022, 53rd Lunar and Planetary Science Conference (2022)

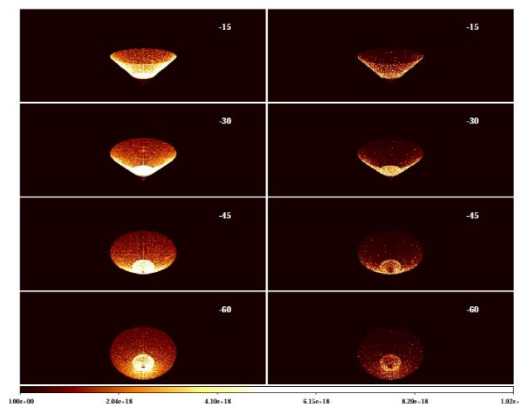


Figure 3: Predicted scattered intensities of the ejecta curtain (Shalima et al., in preparation)

ACADEMIC PROGRAMS

Integrated Ph.D. programme

2021 Physics batch (1st batch) enters 2nd Semester: The Integrated Ph.D. programme of MCNS is a 5.5-year course, that takes meritorious and research-thirsty graduates, teaches them the essential M.Sc. subjects during the 1st two semesters, guides them on a PG-level research project during the 3rd and 4th semesters, and promotes successful students to enroll and do Ph.D. research work. The details of the programme were given in the previous issue of NISARGA. The programme commenced on October 4, 2021, in the physics discipline. After successful completion of the 1st semester in March, presently the 2nd semester is going, and is scheduled to end in July, with the Term-end examinations.

2022 Physics batch (2nd batch) commences: Applications are being received for the 2nd batch, which is scheduled to commence in August, 2022.

SUMMER RESEARCH INTERNSHIP (SRI)

The Summer Research Internship (SRI) program is a six-week annual event held at the MCNS to familiarise and excite students about fundamental research. This year we chose to offer internship positions in six major fields, including Astrophysics, Evolutionary



Botany, Computational Chemistry, Geomorphology, Nanomaterials, and Nuclear Physics, with highly qualified mentors. The advertisement was widely distributed via various science and social media platforms, and we received an unprecedented number of applications: approximately 700 clicks from India and abroad. We chose 15 students across the six different

streams based on their merit and performance in the interview. **Dr. Vasudha Devi**, Deputy Director, Centre for Doctoral Studies, MAHE, officially launched SRI-2022 on the 6th of June. The interns are currently working closely with their mentors and are expected to complete their internship by the 20th of July, 2022. The final presentation of their research work is scheduled for July 15, 2022, followed by the poster competition on July 19, 2022. The posters of the interns will be evaluated by external judges, and the best three posters will be awarded. This year's event is being coordinated by



Dr. Vivek Pandi, Assistant Professor at MCNS.

SHORT CERTIFICATE COURSES

The one-week short certificate courses offered in MCNS includes lectures, and home assignments, and aim at specific skill development as a take-away. Participation certificates will be given to those who attended the entire course chosen and completed the assignments. The following courses were conducted during May-June, 2022.

Title	Start date	Instructor
Introduction to Palynology	09 May 2022	Dr. Navya Reghu
Tectonic Geomorphology	16 May 2022	Dr. Naimisha Vanik
Chemistry with Computer	23 May 2022	Dr. Suranjan Shil
TALYS: A Powerful Tool for Nuclear Reaction Modelling for Various Applications	30 May 2022	Dr. Pareshkumar Prajapati
Introduction to Solar Physics	06 June 2022	Dr. Sreejith Padinhatteeri

SCIENCE OUTREACH ACTIVITIES

MCNS outreach programmes organised during the period of the current issue of this newsletter included celebration of (1) National Science Day, (2) Special documentary shows at the planetarium, and (3) Student club activities. A brief account of these programmes are given below:

1. National Science Day

“Integrated approach in science and technology for a sustainable future”.

The National Science Day is celebrated in the Centre, every year, as a week-long program, under the aegis of Dr. TMA Pai Planetarium, as an outreach activity, with a view to inculcate scientific temper amongst college and school students. This year, “The Science-Day-Week” (21-28 February 2022) program included talks on inspiring topics (A) by invited internationally reputed Indian scientists, and (B) by MCNS experts; the program also included (C) Planetarium shows. The program was arranged in such a way that speakers and audience could participate directly in the MCNS auditorium or through MS-TEAMS online platform. It was also aired through YouTube medium. **Dr. Sreejith Padinhatteeri**, Assistant Professor at MCNS coordinated this program. The details are given below:



MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

Manipal Centre for Natural Sciences
Centre of Excellence

National Science Day Week

Online Mode

21-28 Feb 2022

Two Public Lectures every day.
@3.30 PM and @5 PM

For more information & registration

www.bit.ly/3LmOtqj



www.manipal.edu/mcns-manipal/news-events/science-week.html



Prof. Ajit Kembhavi



Prof. M S Valiathan



Prof. P R Vasudeva Rao



Dr Praveer Asthana



Prof. G C Anupama



Mr A R Shivakumar



Dr K Anupama

Science-week Lectures:

A. Talks by invited experts

- **Dr. P. R. Vasudeva Rao**, Vice Chancellor, Homi Bhabha National Institute Mumbai, Former Director, IGCAR. "Dr Homi Jehangir Bhabha: a legend lives on", 21-Feb 2022.
- **Dr. Praveer Asthana**, PSA Fellow in the office of the Principal Scientific Adviser to the GOI. "Mega projects in science and Indian involvement", 22-Feb 2022.

- **Dr. Anupama K**, Palynologist & Paleoecologist, French Institute of Pondicherry, Puducherry. “Why does the past hold the key to the future?”, 23-Feb 2022.
- **Mr. A. R. Shivakumar**, Researcher and Technology Promoter, formerly a Senior Scientist at KSCST, Indian Institute of Science, Bangalore. “Science Technology & Innovation for a sustainable living around us”, 24-Feb 2022.
- **Prof. G. C. Anupama**, Formerly Dean & Senior professor at Indian Institute of Astrophysics, Bangalore. “Thirty Meter Telescope (TMT) and India’s role in it's development”, 25-Feb 2022.
- **Prof. M. S. Valiathan**, World renowned cardiac surgeon, Padma Vibhushan, former Vice Chancellor, MAHE. “Chitra TTK valves -a triumphant repeat of BhagirathaYagna”, 26-Feb 2022.
- **Prof. Ajit Kembhavi**, Professor Emeritus and former Raja Ramanna Fellow at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune; Former Director, IUCAA, Pune. “The bending of light and the first Black Hole image”, 28-Feb 2022.

B. Talks by MCNS researchers

Name	Title of the talk	Date
Dr. S. V. Suryanarayana	The 120 years of Quantum Physics	21 Feb 2022
Dr. NaimishaVanik	Natural disasters -Are we prepared?	22 Feb 2022
Dr. Vivek Pandi	Global biodiversity and conservation - towards a sustainable future	23 Feb 2022
Dr. Prithviraj M	Integrated S&T approach to achieve sustainability in water resources	24 Feb 2022
Dr. Sreejith Padinhatteeri	Aditya L1 -India's first dedicated space mission to study the Sun	25 Feb 2022
Dr. V. Gopalakrishnan	Nuclear energy in India: why Thorium?	26 Feb 2022
Dr. Kazuyuki Furuuchi	News from Black Holes	28 Feb 2022

C. Planetarium shows as part of National Science Day Celebration

The following documentaries were screened in the Dr. T.M.A. Pai Planetarium, as part of the National Science day week program:

Name of the Movie	Medium of show (number of shows)	Number of participants	Date
Dawn of the Space Age	Kannada (1)	20	26 Feb 2022
Dawn of the Space Age	English (3)	102	28 Feb 2022

2. Documentaries Screened at Dr. T.M.A. Pai Planetarium:

- ***Phantom of the Universe***: From the journey of protons racing through the world's largest particle collider in Europe to up-close views of the Big Bang and emergent cosmos, Phantom of the Universe is a new full dome planetarium show designed to immerse audiences in the search for dark matter (Acknowledgment: European Southern Observatory)
- ***Europe to the Stars***: Europe to the Stars takes the viewer on an epic journey behind the scenes at the most productive ground-based observatory in the world, revealing the science, the history, the technology and the people. Discover the European Southern Observatory in a story of cosmic curiosity, courage and perseverance; a story of observing a Universe of deep mysteries and hidden secrets; and a story of designing, building and operating the most powerful ground-based telescopes on the planet (Acknowledgment: European Southern Observatory)
- ***The Sun, Our Living Star***: The Sun has shone on our world for four and a half billion years. Every person who has ever lived has felt the light that warms our skin today. It is our nearest star and our planet's powerhouse, the source of the energy that drives our winds, our weather and all life. Discover the secrets of our star in this planetarium show and experience never-before-seen images of the Sun's violent surface in immersive full dome format (Acknowledgment: European Southern Observatory).
- ***Out There: The Quest for Extrasolar Worlds***: For thousands of years, mankind thought that the Earth was the centre of the Universe. Thanks to our curiosity, imagination and urge to explore, we now know that planets like our Earth are nothing special in the cosmos. The Sun is just one ordinary star among hundreds of billions in our galaxy, the Milky Way. With the world's most powerful telescopes, we are able to explore more and more of the Universe. A huge diversity of different worlds is out there, just waiting to be discovered (Acknowledgment: European Southern Observatory).
- ***From Earth to the Universe***: The night sky, both beautiful and mysterious, has inspired awe and been the subject of ancient myths for as long as there have been people. A desire to comprehend the Universe is humanity's oldest shared intellectual experience. Yet only recently have we truly begun to grasp our place in the vast cosmos. To learn about this journey of celestial discovery, from the theories of the ancient Greek astronomers to today's grandest telescopes, we invite you to experience from Earth to the Universe (Acknowledgment: European Southern Observatory).

3. Students' Club Activities:

MCNS Students' Clubs, managed by the research students of MCNS, with guidance from faculty, organized the following activities:

Reading Club: Ideas presented in the following documents, given in advance for reading, formed the theme for the discussion in the Reading club meetings:

- "They found hidden patterns in the climate and in other complex phenomena". Published in The Royal Swedish Academy of Sciences; received Nobel Prize in Physics 2021 for studies of complex phenomena. (05-02-2022).
- "A Jovian analogue orbiting a white dwarf star". Published in Nature, February 2021, Vol. 598: 272-275. (05-03-2022).
- "Green infrastructure can limit but not solve air pollution injustice". Published in Nature Communications, August 2021, 12:4681. (02-04-2022).

Nature Club: - The following were the recent nature club activities:

- "Beyond diversity, what do amphibians from the Western Ghats tell us?". Talk given by **Dr. Gururaja K.V**, faculty, researcher, Dean for master's programme in Environment and Society at Srishti Manipal Institute of Art, Design and Technology, MAHE, Bengaluru. (11-03-2022).
- "Lateritic plateaus: A paradise of plant diversity". Talk given by **Dr. Rutuja Kolte**, lecturer, PG Department of Botany, Govindram Seksaria Science College, Belgavi. (09-04-2022).
- "Effect of Disasters on Coastal and Marine Biodiversity". Talk given by **Dr. Pradheeps Muthulingam**, working as Climate & Environment Expert at Project Implementation Unit (PIU), Chennai Metropolitan Development Authority (CMDA), Chennai. (14-05-2022).
- An interactive session on the trending topics of nature was organized as part of nature club activity. Topics are: Global Warming, Plastic Ban- Economy and Environment, Human and Pollution, Deforestation, Natural Wonders, Night Sky and Light Pollution, Life After Pandemic, Food Production and Pesticides, Digital Footprint and Privacy and Preparation for Natural Disaster. (11-06-2022).

Movie Club: - The following were the movies recently screened:

- The life of the Masters [first episode from the documentary series "Einstein and Hawking: Master of our Universe"] (26-03-2022).
- Hiding in Colours (23-04-2022).
- Light from the documentary series Light and Dark [Episode 1] (25 June 2022).

EXPERT TALKS

A. Talks at MCNS by invited experts

- **Prof. Balachandran Sathiapalan**, Institute of Mathematical Sciences, “Black Holes, Holography and Quantum Gravity”, 08 June 2022.
- **Prof. Dr. Carmen Herrmann**, Institute of Inorganic and Applied Chemistry, University of Hamburg, Germany, “Molecular electronics and spintronics as a challenge for first-principles methods”, 22 June 2022.
- **Dr. Jessica Budke**, Assistant Professor & Herbarium Director (TENN), Dept. of Ecology and Evolutionary Biology, University of Tennessee Knoxville, TN 37996, United States, “Connecting with Biodiversity Collections: Structure-Function Relationships and Morphological Evolution in Mosses”, 29 June 2022.

B. Talks given at other institutions by MCNS experts on invitation

- **Dr. Vivek Pandi** went as a technical expert for Ministry of Environment, Forest and Climate Change (MoEFCC) sponsored “Advanced Course in Parataxonomy”, Madras Christian College, Chennai, 17 February 2022.
- **Dr. Vivek Pandi**, went as a technical expert for MoEFCC sponsored “Green Skill Development Program”, Madras Christian College, Chennai, 18 February 2022.
- **Dr. Sreejith Pandinhatteeri**, "Aditya-L1; India's First Dedicated Space Observatory to Study the Sun", Department of Science, St. Francis de Sales College, Bengaluru in collaboration with TERAOM Limited, London, 27 May 2022.
- **Dr. Sreejith Pandinhatteeri** was invited as a speaker for the Aditya- L1 / VELC Science Workshop and delivered a talk on “VELC & SUIT - a few combined science problems”, organised by Inidan Institute of Astrophysics at the Kodaikanal Solar Observatory, Kodaikanal, Tamil Nadu, 10th June 2022.
- **Dr. Paresh Prajapati**, “ $^{13}\text{C}(\alpha, n)^{16}\text{O}$: The Potential Source of Neutrons for the s-Process”, Eleventh European Summer School on experimental nuclear astrophysics, Catania, Italy, 16 June 2022.

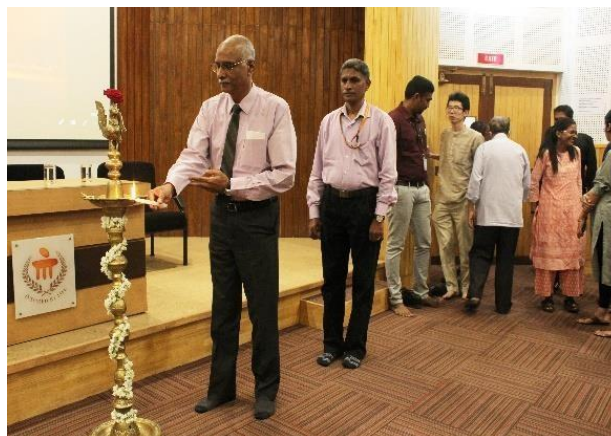
C. Talks given at other institutions by MCNS students

- **Ms. Suvedha Suresh Naik**, a Ph.D. scholar of MCNS has given a talk about "Probing primordial features due to particle production during inflation in the CMB data" at IIT Madras on the eve of cosmology group meets on 9 April 2022.
-

WORKSHOPS AND TRAINING

1. Plant Inventory Methods - I (14 - 15 February 2022)

A two-day online workshop on Plant Inventory methods was organized by the Manipal Centre for Natural Sciences on the 14th and 15th of February, 2022. This custom workshop was designed as a prerequisite for field botany, plant ecology, and forestry studies. Experts from various fields were invited to share their perspectives on plant inventory methods. The workshop provided a theoretical and practical approach to plant identification, cataloging, study plot establishment, long-term monitoring, the role of GIS in plant inventory studies, and field data analysis and interpretation. The technical sessions were attended and benefitted by 140 participants from all over India. This event was organized by **Dr. Vivek Pandi**, Assistant Professor at MCNS.



Number of technical sessions: 7 Number of participants: 140

2. General Radiation Awareness and Safety Program (GRASP)

General Radiation Awareness and Safety Program (GRASP), intended primarily to create awareness about radioactivity and safety around laboratories involving radiation sources, is conducted every year. This is done as prescribed by the Atomic Energy Regulatory Board (AERB), since MCNS has a few experimental facilities involving very low-level radioactive emissions. All the MCNS faculty, staff and students attend this program. Site-specific training and awareness tests are conducted by Dr. K.V. Subbaiah, Consultant Professor, and Radiological Safety Office (RSO), on 04-May-2022. Participation Certificates were issued.



Dr. K.V. Subbaiah

NEW JOINEES

- **Dr. Naimisha Vanik**, Post-doctoral Fellow, joined the Centre in January 2022. Her interests are in Geomorphology and Tectonics.



- **Dr. Suranjan Shil**, Assistant Professor, joined the Centre in February 2022. His area of research interests is in Organic Diradicals, Charge-Transfer Complexes, Chiral Molecules, and Complexes.



- **Dr. Chandrachur Chakraborty**, Assistant Professor, joined the Centre in February 2022. His research interests are in General Relativity & Theoretical Astrophysics.



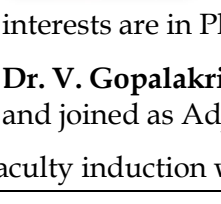
- **Dr. Rupak Roy**, Post-doctoral Fellow, joined the Centre in February 2022. His area of research is in High Energy Astrophysics



- **Dr. Sumana Nandi**, Assistant Professor, joined the Centre in February 2022. Her research interests are in Active Galactic Nuclei (AGN), Relativistic jets, Radio galaxies, and Binary black holes



- **Dr. Navya Reghu**, Post-doctoral Fellow, joined the Centre in February 2022. Her interests are in Palynology and Ecology.



- **Dr. Chaitra Aithal**, Senior Staff Scientist, joined the Centre in February 2022. Her research areas are Metal oxide-based thin films & Nanostructures for gas sensors.



- **Dr. Paresh Prajapati**, Assistant Professor, joined the Centre in March 2022. His research interests are in Nuclear- induced reactions for various applications and Nuclear Astrophysics

- **Dr. Sumit Kumar**, Assistant Professor, joined the Centre in March 2022. His research interests are in Particle Physics Phenomenology and Neutrino Physics.

- **Dr. Shalima Puthiyaveetil**, Assistant Professor, joined the Centre in April 2022. Her research interests are in Planetary Science and Astrophysics.

- **Dr. V. Gopalakrishnan** relinquished his position as Consultant Professor, and joined as Adjunct Professor, w.e.f. June 1, 2022.

A faculty induction workshop was conducted in MCNS on 16 March 2022.

AWARDS AND RECOGNITIONS

MCNS congratulates the following for their accomplishments:



(MDPI).

Dr. Chandrachur Chakraborty, Assistant Professor, MCNS has become a life member of Indian Association for General Relativity and Gravitation (IAGRG), and the Astronomical Society of India (ASI) from March 2022. He is also a reviewer board member and guest editor of the special issue (Analogue Gravity) of Multidisciplinary Digital Publishing Institute



Mr. Sachin Vasanta Shet, Staff Scientist, MCNS: His nomination as a Radiological Safety Officer (RSO) of MAHE, Manipal has been approved by the Atomic Energy Regulatory Board (AERB) on 27 April 2022. He attended three levels of intensive training and tests and obtained his certificate as RSO.



Dr. Prajapati Pareshkumar Manharbhai, Assistant Professor, MCNS is honored with Scientific Associateship by Istituto Nazionale di Fisica Nucleare (INFN, Italy) at Laboratori Nazionali del Sud at Catania, Italy for research activities from 1st May, 2022 to 30th April 2023.



Dr. Debbijoy Bhattacharya, Associate Professor, MCNS has become a member of the International Astronomical Union (IAU), France on 13 June 2022.

ACHIEVEMENTS

A. Faculty of MCNS

Dr. Debbijoy Bhattacharya, Associate Professor, MCNS, received a grant from Department of Space, Govt. of India for his project entitled “Study of emission mechanism of spatially resolved astrophysical jets in AGN using AstroSat observation.”



Dr. Kazuyuki Furuuchi, Associate Professor, MCNS, received a grant from Department of Science & Technology, International Co-operation Division, Govt. of India for his project entitled “Constraints from Ultraviolet Completion on Cosmology”.

B. Student of MCNS

Mr. Krishna Mohana A, Ph.D. scholar of MCNS has submitted his Ph.D. thesis titled “Understanding Blazar Emission Processes Using Multiwavelength Spectral and Timing Studies” under the guidance of Dr. Debbijoy Bhattacharya on 27 May 2022 to MAHE, Manipal.



OBSERVANCE OF COMMEMORATIVE / IMPORTANT DAYS

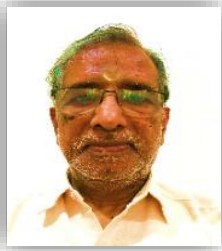
- Observance of Republic Day 2022, informal theme: “**India is a Republic: What it means to me!**”
- MCNS Celebrated **National Science Day** as a week-long event, from 21 to 28 February 2022, as briefed elsewhere in this issue.
- MCNS Celebrated **Women’s Day** on 8 March 2022 as an in-house event inviting all the MCNS staff and their family members. The theme of the event was “*Gender equality today for a sustainable tomorrow*”. The program consisted of an invocation, welcome address, recitals, talks, short audiovisual, vote of thanks, National Anthem, refreshments and group photographs. **Dr. Naimisha Vanik**, a post-Doctoral Research Fellow in MCNS, compered the event.
- MCNS celebrated **World Earth Day** on 22 April 2022 through multiple quiz contests organized by Earth & Planetary Science group where faculty and staff members participated. **Dr. Vivek Pandi**, **Dr. Naimisha Vanik**, and **Dr. Navya Reghu** organized the event.
- We celebrated the **124th birth Anniversary of the founder Dr. TMA Pai** on Saturday, April 30, 2022.

PUBLICATIONS

1. Jyoti Pandey, Bhawna Pandey, P.V.Subhash, PritiKanth, M.Rajput, S.Vala, Rajnikant Makwana, S.V. Suryanarayana and H.M. Agrawal. (2022). Estimation of production cross-sections, transmutation and gas generation from radionuclides (A ~50–60) in fusion environment. *Applied Radiation and Isotopes*, 184 (2022), 110163.
2. Chandrachur Chakraborty and Banibrata Mukhopadhyay. (2022). Spin Precession in the Gravity Wave Analogue Black Hole Spacetime. *Universe* 2022, 8, 193.
3. Chandrachur Chakraborty (2022). Gravitational analog of Faraday rotation in the magnetized Kerr and Reissner-Nordström spacetimes. *Physical Review D*, 105, 064072.
4. Vibhuti Vashi, Rajnikant Makwana, B. Quintana, M. H. Mehta, B. K. Soni, S.

- Mukherjee, R. K. Singh, R. Chauhan, P. M. Prajapati, M. Abhangi, S. Vala, N. L. Singh, G. B. Patel, S. V. Suryanarayana, B. K. Nayak, S. C. Sharma, T. N. Nag, and Y. Kavun. (2022). Cross-section measurement of the $^{114}\text{Cd} (p, \gamma) ^{115\text{m}}\text{In}$ reaction for nuclear reactor and astrophysical applications. *Physical Review C*, 105, 044613.
5. Sachin Shet, Kapil Deo Singh, S. Anand and K.V. Subbaiah. (2022). MCkEff: An Indigenous Monte Carlo Code for estimation of Neutron Multiplication factor of Fissile Systems. *Journal of Information and Computational Science*, 12 (4): 931-947.
 6. AkashHingu, Bhargav Soni, Siddharth Parashari, Rajnikant Makwana, P.M. Prajapati, Vibhuti Vashi, Mayur Mehta, R.Palit, S.V.Suryanarayana, B.K.Nayak, K.Katovsky, S.Mukherjee. (2022). Cross-sections for production of $\text{In}^{115\text{m}}$ by quasi-monoenergetic neutrons within 7-20 MeV. *Radiation Physics and Chemistry*, 199 (2022), 110270.
 7. Alpa Sridhar, Falguni Bhattacharya, Naimisha Vanik, D. M. Maurya And L. S. Chamyal. (2022). Late Pleistocene history of aggradation and incision within a bedrock gorge, Narmada River, central India: implications for resurgent tectonic activity and changing climate. *Journal of Quaternary Science*, 2022:1-7.
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