



National Workshop

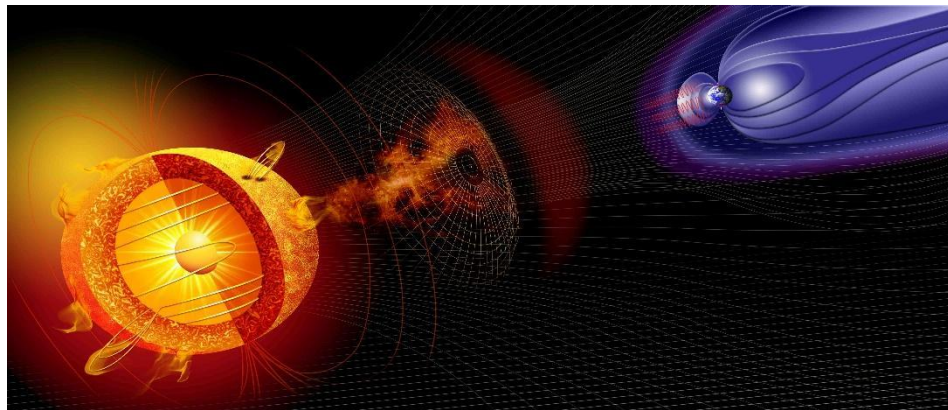
On

Coronal Mass Ejection Kinematics (NW_CMEK-2022)

24-27 August 2022

No. of Participants: 27

Centurion University of Technology and Management, Odisha



A National Workshop on Coronal Mass Ejection (CME) Kinematics (NW_CMEK-2022) was organised and conducted jointly by the Department of Physics and the Research Centre for Data Science and Machine Learning of the Centurion University of Technology and Management, Odisha during 24-27 August 2022.

CMEs are energetic dense clouds of plasma with frozen-in strong magnetic fields which get ejected at various speeds from time to time from the Solar Corona. Strongly energetic CMEs traveling at high speeds and reaching the Earth's Magnetosphere can create destructive geomagnetic storms. In the modern-day world, such storms can create wide-ranging impact. These storms carry potential to incinerate power grids, blow-up inter-continental crude oil pipelines, jeopardise telecommunication networks including air transport etc. The indispensable importance of these installations in a modern, upcoming country like India cannot be overstated. Hence the importance of the study and forecasting of CMEs, labelled "Space Weather Studies".

However, currently a detailed scientific analysis of the reasons for CMEs barely exists. Sufficient instrumentation and satellite systems to observe and collect the data on kinematics of the CMEs from near the Corona to the Earth are yet to be put in place. Therefore, effective forecasting of "Space Weather" is not possible yet. It is, therefore, very much necessary to motivate young and aspiring graduates of Physics and Engineering to join this area of research. To this end, it is important to expose them to various theoretical and practical

aspects of CME Kinematics and Space Weather. It is important for the budding young researchers aspiring to get exposed to current status of research in these areas and the open, unanswered and unasked questions therein. The Workshop aimed to address this requirement.

The Workshop was conducted on Hybrid Mode. Renowned researchers and scientists of institutes of repute in India and abroad joined resource persons, delivered talks on various aspects of CME Kinematics and conducted Hands-on visualization and simulation lab sessions. (A detailed list of resource persons and the topics they covered and the schedule of the Workshop is given below).

One hundred online and off-line participants (Students of BSc, MSc and Ph.D students) from across India and a few countries abroad (Nigeria and USA) participated and presented posters during the Workshop. No registration fees were charged. (A graphical representation of the participants' profile is attached). Students of CUTM and NISER, Bhubaneswar attended and presented posters as off-line (in-person) participants. (Photographs of these sessions are attached) At the valedictory function, participants expressed a very high of appreciation of the Workshop and urged for more such events.

Follow-up action:

Participants were given several theoretical and practical assignments based on topics covered during the 4-day Workshop. Certificates of Participation are issued only to those registered participants who submitted the completed assignments. Certificates of Appreciation are also issued to those participants who presented the results of their studies relevant to the theme of the Workshop.

List of Resource Persons, Topics Covered and Schedule of Sessions:

	Lecture 1 10 am-11.15 am	Lecture 2 11.30am-12.45pm	Lab 1 2pm-3.15pm	Lab 2 3.30pm-4.45pm
Day 1 24/08/22	Features of the Sun (Dr. Ram Ajor Maurya)	Energetic events on the Sun and Solar Cycle (Dr Anitha Ravishankar)	Accessing and plotting remote sensing data (Ashutosh Pattnaik)	Visualizing solar energetic events through several solar cycles (Ashutosh Pattnaik)
Day 2 25/08/22	MHD equations and solar wind (Dr Nishant Singh)	Propagation of CMEs through interplanetary space (Dr Wageesh Mishra)	GOES Xray flare light curve (Dr. Ram Ajor Maurya)	Plotting sunspot number v/s time curve (Dr. Ram Ajor Maurya)
Day 3 26/08/22	Types of solar observatories and contribution from India (Dr Shibu Mathew)	Current state of space weather forecasting and future prospects (Dr Ranadeep Sarkar)	Accessing and interpreting in situ magnetospheric data (Ashutosh Pattnaik)	Modeling of solar wind and magnetospheric data (Ashutosh Pattnaik)
Day 4 27/08/22	Impact of Halo CMEs on artificial satellites- A case study of Starlink satellite damage (Ashutosh Pattnaik)	Positional astronomy with instruments designed by Pathani Samanta (Dr Subhendu Pattnaik)	Students' poster presentation	Announcement of winners of poster presentation session

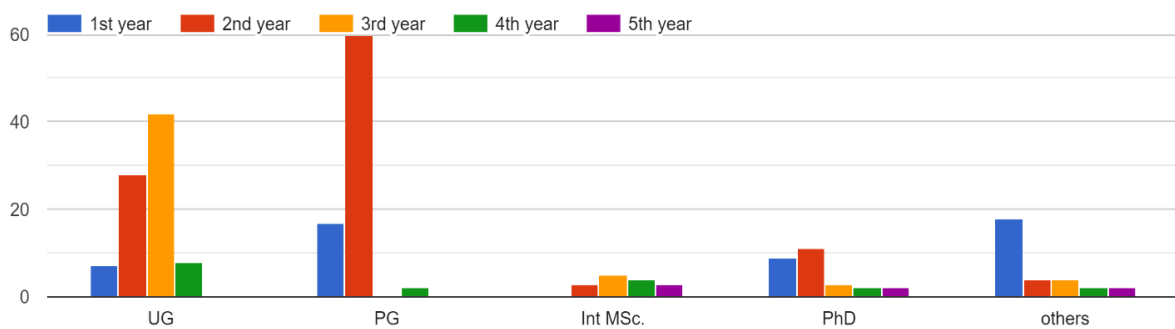
Speakers :

- Prof. Ram Ajor Maurya , NIT Calicut, Kerala, India
- Dr Anitha Ravishankar , University of Calgary , Alberta , Canada

- Prof. Nishant Singh , IUCAA, Pune, Maharashtra, India
- Dr. Wageesh Mishra , Indian Institute of Astrophysics , Bangalore, Karnataka, India
- Dr. Shibu K Mathew , Udaipur Solar Observatory, Rajasthan, India
- Dr. Ranadeep Sarkar , Helsinki University, Helsinki, Finland
- Dr. Subhendu Pattnaik , PathaniSamanta Planetarium , Bhubaneswar, India
- Ashutosh Pattnaik, Research scholar, Astronomical Observatory of Jagiellonian University, Krakow, Poland.

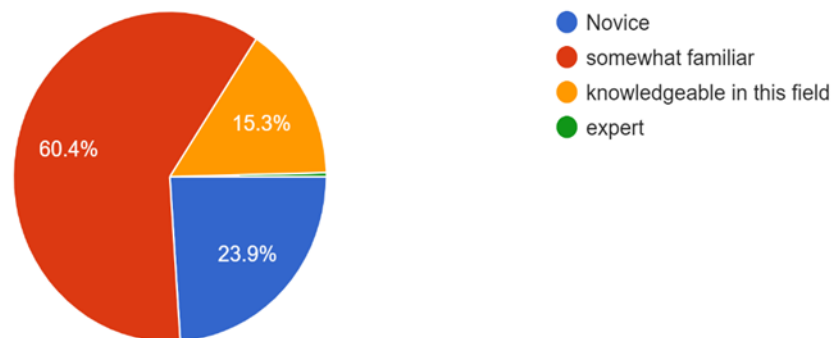
Participant Profile:

Academic Background



Familiarity with concepts of solar physics

255 responses



NO. of Participants

1	Prajna Paramita Debata	Asst. Professor
2	Babuli Kumar Jena	Asst. Professor
3	Dilip Kumar Mohanta	Asst. Professor
4	Dr. Kapileswar Mishra	Professor
5	Dr. Kamal Kumar Barik	Associate Professor
6	Dr. Siba Prasad Mishra	Associate Professor
7	Sagarika Panda	Asst. Professor
8	Snigdha A Sanyal	Asst. Professor
9	Sadhana Devi	Asst. Professor
10	Vignesh M.	Asst. Professor
11	Mr. Vignesh	Assistant Professor
12	Dr. Sujata Chakravarty	Professor & HOD
13	Dr. Sangram Keshari Swain	Associate Professor
14	Dr. Sabyasachi Mohanty	Associate Professor
15	Dr. P Annan Naidu	Asst. Professor
16	Dr. Bhabendu Kumar Mohanta	Asst. Professor
17	Sasmita Kumari Nayak	Asst. Professor
18	Manoj Kumar Behera	Asst. Professor
19	Mamata Garanayak	Asst. Professor
20	Suwendu Kumar Nayak	Asst. Professor
21	Shivani Nanda	Asst. Professor
22	Raj Kumar Mohanta	Asst. Professor
23	Rakesh Kumar Ray	Asst. Professor
24	Shreela Dash	Asst. Professor

25	Nilamadhab Dash	Asst.Professor
26	Mamata P Wagh	Asst. Professor
27	Debaraj Rana	Asst. Professor



Dr. Prasanta Ku. Mohanty
Dean Academic