



**Dempo Charities Trust's
Dhempe College of Arts and Science
Miramar, Panaji – Goa**

**Department of Physics
&
Department of Mathematics**

Report of Two-day State Level Workshop

The Department of Physics and Mathematics of DCT's Dhempe College of Arts and Science, Miramar, Goa, successfully organized a **Two-Day State-Level Workshop on "Indian Mathematics in Astronomy and Astrophysics"** on **24th and 25th January 2025**. The workshop aimed to explore the significant contributions of Indian mathematicians to astronomy and astrophysics, fostering awareness and appreciation of Indigenous scientific heritage. The event witnessed enthusiastic participation from 43 students and 9 faculty from Dhempe College students, 19 students and 4 faculty across the state.

The workshop commenced with a grand inaugural ceremony graced by esteemed dignitaries: Principal, **Prof. Dr. P.S. Ramu Murthy**, Chief Guest, **Prof. Vithal Tilvi**, Vice-Principal, Dr. Swati Pawar, workshop Coordinator, Dr. Miskil Naik and Co-coordinator, Mrs. Susan Miranda. At the outset, Ms. Siddhi Parsekar welcomed the dignitaries on the dais and the audience for the workshop. The plant watering ceremony, a symbol of rejuvenation, growth, and spread of knowledge, marked the auspicious commencement of the inaugural function. The **Principal of Dhempe College, Prof. Dr. P.S. Ramu Murthy**, delivered the welcome address, highlighting the relevance of ancient Indian mathematical principles in contemporary astrophysical research.

The Vice-Principal, Dr. Swati Pawar welcomed the gathering and introduced the **Chief Guest, Prof. Vithal Tilvi**, a renowned astrophysicist and Professor at the Goa State Higher Education Council, Porvorim-Goa.

Prof. Vithal Tilvi spoke on the legacy of Indian mathematics in celestial studies and emphasized revisiting traditional Indian mathematical concepts in the modern scientific landscape in his keynote speech. The inaugural session concluded with a vote of thanks by the co-coordinator of the workshop Mrs. Suzana Miranda.

The first session conducted by Prof. Tilvi provided a comprehensive overview of India's rich astronomical heritage. He highlighted the works of our mathematicians emphasizing their groundbreaking calculations in planetary motion, eclipses, and trigonometry. The session then transitioned into a discussion on **India's current astronomical research**, including projects like the **Indian Space Research Organisation (ISRO)**'s **Aditya-L1 mission, ASTROSAT, and Chandrayaan**. Later the participants were asked to design a calendar by imagining themselves in ancient times. This activity enabled the understanding of hardships faced in

preparing the present-day calendar. He also highlighted the expertise of ancient civilizations in observing their surroundings and devising various techniques to describe and eventually study the world around them.

This was followed by the sunspot observation activity using a sophisticated telescope where the participants were informed about the types, sizes, and information provided by these sunspots. Prof. Tilvi also talked about his PhD work at the University of Arizona and the discovery of a new galaxy by him and his team which was a result of years of patient sky observation. The participants were very motivated after attending the session. As a token of gratitude, Prof. Tilvi was presented with a memento. The audience then broke for lunch.

Post-break Ms. Siddhi Parsekar welcomed the next speaker, **Dr. Venkateshwara R. Pai**. Dr. Miskil Naik introduced the speaker. Prof. began the session by explaining the numbering systems used by our great mathematicians during ancient times. He described the '**Bhūtasāṅkhya**' system which is based on assigning a number to a being such as eyes representing the number two, the ocean representing the number 4, and so on. Using these physical beings, phrases were made that gave a certain number.

The '**Āryabhaṭa**' system was discussed next. It is an alpha-numeric system devised and used by Aryabhata. This system assigned numbers to the Sanskrit alphabet from which words were formed to obtain a number. The '**Kaṭapayādi**' system was next which also assigns numbers to a set of alphabets and then words were made from those which gave the corresponding numbers. Using these systems our great mathematicians wrote shlokas describing the physical world around them. Prof. explained each of these systems in great detail and highlighted the simplicity of the **Kaṭapayādi** system.

Prof. Venkateshwara recited multiple shlokas in these numerical systems which informed that the number of revolutions of the sun around the earth is equal to the number 4320000. For example the following shloka informs about the same fact: arkaparyayāḥ kha-abhra-kha-gagana netra-guṇa-sāgara | (Siddhāntaśiromāṇi -- Bhāskara II - 12th Century – Mahārashtra). The participants were told to obtain various numbers from words using the above systems. The overall session by Prof. Venkateshwara was energizing and informative. The day concluded with an engaging question-and-answer session.

The **second day** of the two-day workshop on 'Indian Mathematics in Astronomy & Astrophysics', organized by the Departments of Mathematics and Physics of Dhempe College of Arts & Science, commenced with a warm welcome extended to the dignitaries on the dais—Principal Dr. Ramu Murthy, Vice Principal Dr. Swati Pawar, and the first resource person of the day, Mr. Satish Nayak.

The proceedings began with Ms. Ojaswi presenting a bouquet of flowers to Mr. Satish Nayak, followed by Ms. Ridhi Alornekar delivering a brief summary of the previous day's activities and introducing the esteemed speaker. Mr. Nayak delivered an insightful lecture on "Growth of Indian Astronomy," shedding light on the Vedas and dispelling misconceptions surrounding ancient Indian astronomy. He highlighted historical instances showcasing India's profound

contributions to astronomy, captivating the audience with his depth of knowledge. Dr. Miskil Naik summarized the key takeaways from the lecture, after which the Principal presented a memento to Mr. Satish Nayak. The session concluded with a tea break.

Post-break, Ms. Ridhi welcomed the next resource person, Dr. Venkateshwara Pai, who delivered a compelling session on the contributions of Indian mathematicians. Dr. Pai discussed Madhava's 14th-century computation of the value of π using pure mathematical techniques, demonstrating the brilliance of ancient Indian mathematics. His session was deeply appreciated, and a memento was presented to him by the Principal. The audience was then adjourned for a lunch break.

In the afternoon session, Dr. Reshma Raut Dessai was welcomed with a bouquet by Sartaj, and her introduction was given by Dr. Miskil Naik. Dr. Dessai's lecture on "Career in Astrophysics" provided insights into her research on X-ray astrophysics and emphasized the importance of mathematics, physics, and patience in the field of astronomy. She also discussed various career paths in astronomy and astrophysics, inspiring the audience, particularly female students, to pursue research. Her impactful session concluded with the Principal presenting her with a memento.

The final speaker of the day, Dr. Santosh Das, was welcomed with a bouquet by the Principal, and Ms. Siddhi Parsekar introduced him. Dr. Das shared his research and explained the Quark Model in a simple and engaging manner, making complex concepts accessible to the audience. He also discussed the Big Bang model in the lab, providing insights into experimental approaches to studying early-universe conditions. Additionally, he highlighted career opportunities at IIT, offering guidance to students interested in advanced research.

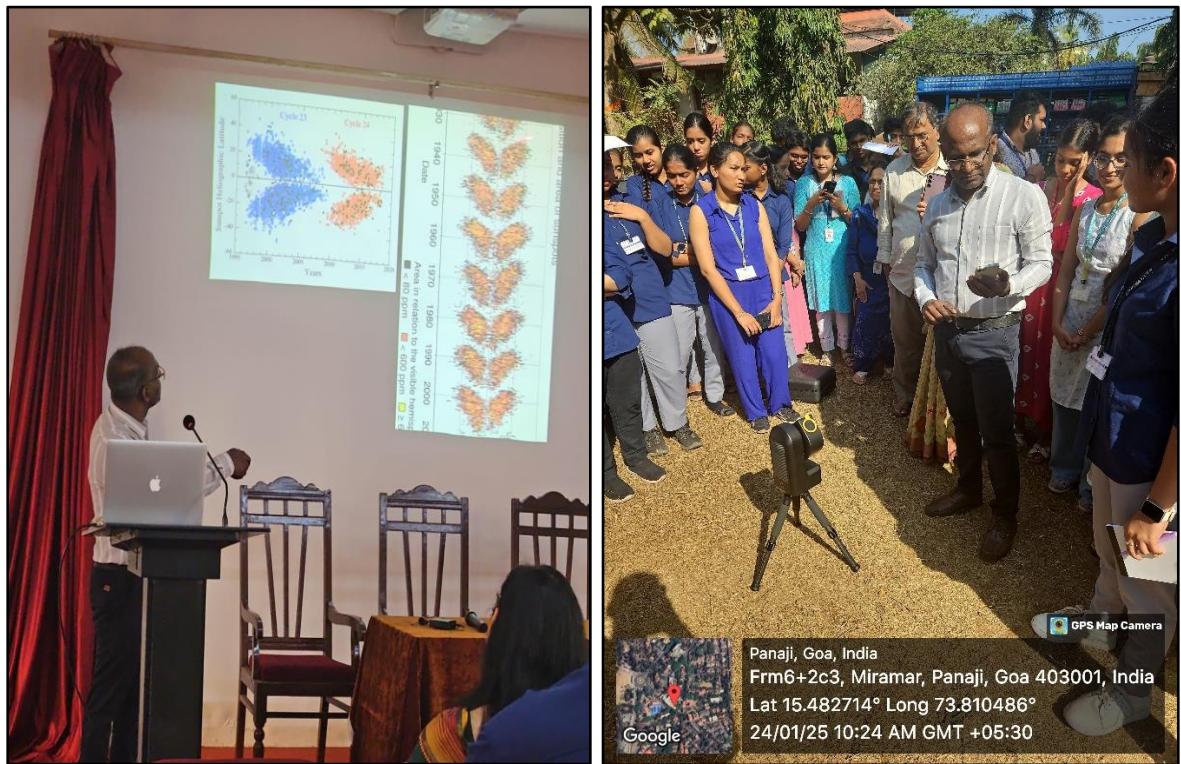
The day concluded with the valedictory function, where the dignitaries—Principal Dr. Ramu Murthy, Vice Principal Dr. Swati Pawar, coordinators Dr. Miskil Naik and Mrs. Maria Suzana Miranda, and resource persons Dr. Reshma Raut Dessai and Dr. Santosh Das—took their places on the dais. The Principal and Vice Principal addressed the gathering, and the resource persons shared their reflections on the workshop, motivating the audience with their words. The event concluded with a vote of thanks by Dr. Miskil Naik and Mrs. Maria Suzana Miranda, followed by the distribution of participation certificates and refreshments.

The two-day workshop was a resounding success, leaving participants enriched with knowledge and inspired to explore the fascinating fields of mathematics and astronomy.

Glimpses of the workshop



Inaugural ceremony



Prof. Tilvi delivering the session.

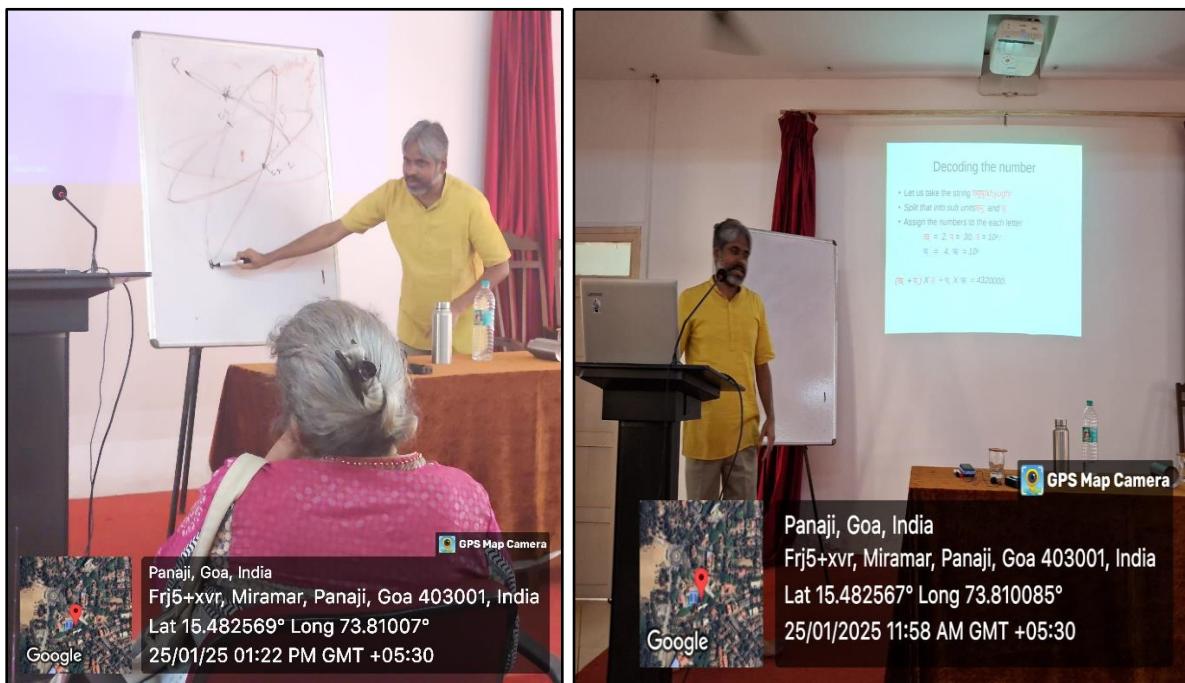
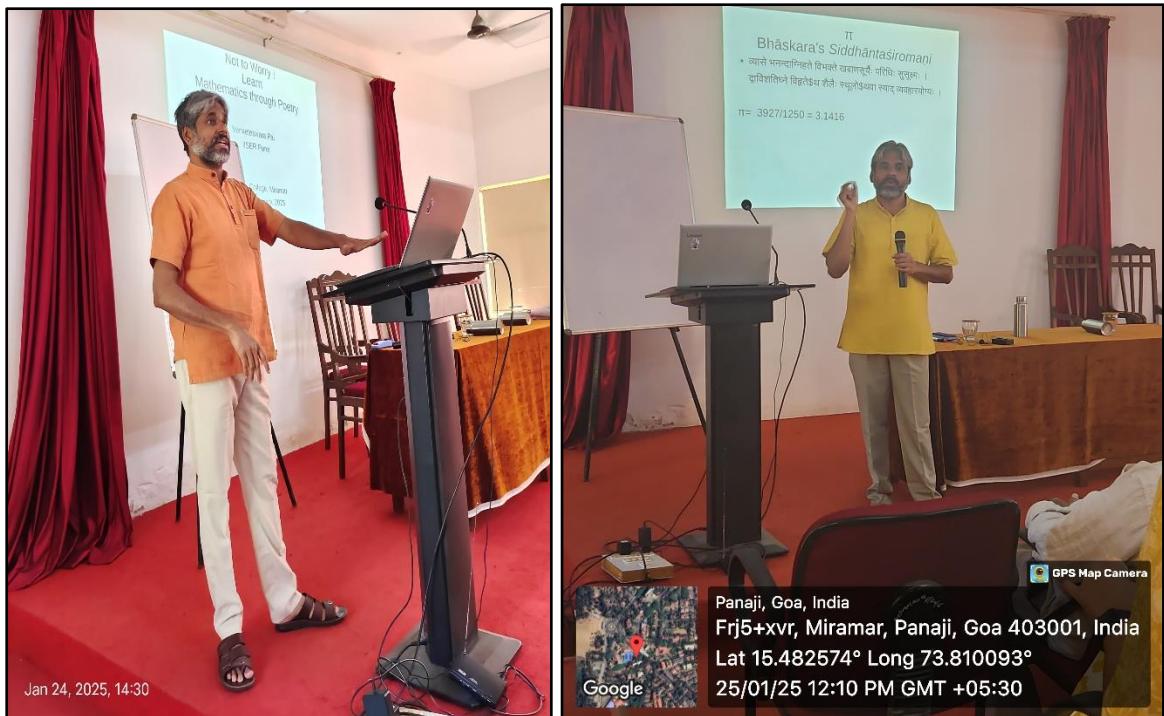
Sun-spot observation



Sun-spot observation



Students working in groups to complete the assigned task.



Prof. Venkateshwara delivering the session.



Mr. Satish Nayak delivering the session.



Dr. Reshma Raut Dessai



Dr. Santosh Das



Valedictory function



Principal expressed his thoughts on the workshop.



Principal expressed his thoughts on the workshop.



Dr. Miskil Naik delivering the vote of thanks.



Attendance record of the Workshop

**TWO DAYS STATE LEVELWORKSHOP
ON
'Indian Mathematics in Astronomy & Astrophysics'
on 24 & 25 JANUARY 2025**

ATTENDANCE

DATE: 24/01/2025

CLASS: F.Y BSC

SR NO	ROLL NO	NAME OF STUDENT	SUBJECT	SIGN
01	2406154	Harih Bhande	EVs & Psychology	<i>Harih Bhande</i>
02	2406166	Agnelia Fernandes	Geology, EVs & Psychology	<i>Agnelia Fernandes</i>
03	2406158	Uma Naik	EVs & Economics	-
04	2406170	Shreelalita A. Bhatmangali	Geology, EVs & Psycho	<i>Shreelalita A. Bhatmangali</i>
5.	2406187	Shreya Pednekar	VAC: EVs MC: Psychology	<i>Shreya Pednekar</i>
6.	2406186	Sanchita Sawant	EVs, Political Science	<i>Sanchita Sawant</i>
7	2406193	Dikshita D. Raut	VAC: EVs MC: History	<i>Dikshita D. Raut</i>
8.	2406185	Saloni R. Raut	VAC: EVs MC: Economics	<i>Saloni R. Raut</i>
9.	2406109	Siya S. Godkar	MINOR: CHEMISTRY VAC: EVs MC: PHILOSOPHY	<i>Siya S. Godkar</i>
10	2406111	Tushita A. Phape	MINOR: CHEMISTRY VAC: EVs MC: ECONOMICS	<i>Tushita A. Phape</i>
11	2406190	Sunesh S. Gomkar	MINOR: CHEMISTRY VAC: EVs MC: PHILOSOPHY	<i>Sunesh S. Gomkar</i>
12	2406106	Pariket Naik	MINOR: CHEMISTRY VAC: EVs MC: PHILOSOPHY	<i>Pariket Naik</i>
13	2406152	Ankit Yadav	Minor: CSA VAC: EVs MC: Economics	<i>Ankit Yadav</i>
14	2406171	Shreeniway Iot Naik	Minor: geology VAC: EVs MC: Psychology	<i>Shreeniway Iot Naik</i>
15	2406182	Chirag Kangji	VAC: EVs MC: Economics	<i>Chirag Kangji</i>
16	2406155	Pratik Bhulimbar	VAC: EVs MC: Economics	<i>Pratik Bhulimbar</i>
17	2406206	Kanak Naik	VAC: EVs MC: Economics	<i>Kanak Naik</i>

TWO DAYS STATE LEVEL WORKSHOP

ON

'Indian Mathematics in Astronomy & Astrophysics'
on 24 & 25 JANUARY 2025

ATTENDANCE

DATE: 24/01/2025

CLASS: S.Y BSC

SR NO	ROLL NO	NAME OF STUDENT	SUBJECT	SIGN
1	2302166	Mitali Shindolkar	Maths (4)	Shindolkar
2	2302169	Saiesha Gawas	Maths(4)	Saiesha
3	2302161	Aastha Naik	Maths (4)	Aastha
4	2302156	Sumukh Kamat	Phy	S.K
5	2302148	Ojaswi Durbhathkar	Physics	Ojaswi
6	2302055	Prachi Chopdenkar	physics	Prachi
7	2302146	Abhishek Verma	"	Abhishek
8	2302168	Rani Bedatolakar	maths (4)	Rani
9	2302069	Gayatri Satandekar	Physics	Gayatri
10	2302149	Omkar Dhoni	"	Omkar
11	2302077	Sonali Rane	"	Sonali
12	2302070	Harish Kalbasi	"	Harish
13	2302165	Maheshwar Parab	Maths(u)	Parab
14	2302172	Vishant R. Borkar	Maths(4)	V.Borkar

**TWO DAYS STATE LEVEL WORKSHOP
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DATE: 24/01/2025

CLASS: T.Y BSC

TWO DAYS STATE LEVEL WORKSHOP
 ON
 'Indian Mathematics in Astronomy & Astrophysics'
 on 24 & 25 JANUARY 2025

DATE: 25/01/2025

ATTENDANCE

CLASS: F. Y BSC

SR NO	ROLL NO	NAME OF STUDENT	SUBJECT	SIGN
1	2406166	Agnelia fernandes	SEC-chem, EVS, PSYCO	<u>Agnelia...</u>
2	2406170	Shreelalita .C. Bhatmarigali	SEC(chem), EVS, Psychology	<u>Shreelalita...</u>
3	2406158	Uma Nair	SEC(Math), EVS, Economics	<u>Uma</u>
4	2406185	Saloni Raut	SEC(PHYSICS), EVS, Economics	<u>Saloni</u>
5	2406187	Shreya Pednekar	SEC(PHYSICS), EVS, PSYCHOLOGY	<u>Shreya...</u>
6	2406183	Dikshita Raut	SEC(Physics), VAC-EVS, MC: History	<u>Dikshita</u>
7	2406186	Sanchita Bawant	SEC PHYSICS, VAC-EVS MC: POLITICAL SCIENCE	<u>Sanchita</u>
8.	2406123	Devilakshmi Nambiar	SEC;Geo, VAC-EVS MC: Economics	<u>Devilakshmi</u>
9.	2406109	Siya . S. Godkar	SEC [Physics], Vac-EVS MC - Philosophy	<u>Siya...</u>
10.	2406110	Suresh . S. Gorekar	SEC-[Physics], VAC-EVS MC - Philosophy	<u>Suresh...</u>
11.	2406154	Hansh Ghonde	SEC [Maths], EVS, psychology	<u>Hansh</u>
12	2406206	Kanak . B. Naik	SEC (cs), EVS, Economics	<u>Kanak</u>
13	2406182	Chirag Kanaji	SEC- Physics , VAC-EVS MC- Economics	<u>Chirag</u>
14	2406155	Pratik BhumiBar	SEC-Maths VAC -EVS MC - Economics	<u>Pratik</u>
15	2406152	Ankit Yadav	SEC - maths VAC-EVS MC - Economics	<u>Ankit</u>
16	2406171	Shreeniketan Lotlikar	SEC-Chemistry MC-Psychology	<u>Shreeniketan</u>

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ATTENDANCE

DATE: 25/01/2025

CLASS: S.Y.BSC

SR NO	ROLL NO	NAME OF STUDENT	SUBJECT	SIGN
01	2302172	Vishant R. Borkar	Maths (3)	V Borkar
02	2302165	Maheshwar Parab	Maths (3)	
03	2302168	Rani Bedadolekar	Maths (3)	RM
04	2302161	Anvitha Naik	Maths (3)	
05	2302166	Mitali Shiradkar	Maths (3)	
06	2302169	Sareeha Gramse	Maths (3)	
07	2302070	Harish Kalbri	Physics	Har
8	2302156	Sumukh Kamat	Phy	SK
9	2302148	Ojaswi Durbhatkar	Physics	Ojaswi
10	2302055	Prachi Chopdekar	Physics	Prachi
11	2302146	Abhishek Verma	Physics	Abhishek
12	2302152	Rouit Raj	Physics	Rouit
13	2302149	Omkar Dhuri	Physics	Omkar
14	2302077	Sonal Rane	Physics	AZ
15	2302069	Gayatri Satandekar	Physics	GS

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DATE: 25/01/2025

ATTENDANCE

CLASS: TY BSC

SR NO	ROLL NO	NAME OF STUDENT	SUBJECT	SIGN
1	2202164	Clyde De Araujo	Physics	<u>Clyde Araujo</u>
2	2202267	Ainsley Azavedo	Maths	<u>Ainsley Azavedo</u>
3	2202166	Ropal Haldankar	Physics	<u>Ropal Haldankar</u>
4	2202258	Milisha Almeida	Maths	<u>Milisha Almeida</u>
5	2202269	Meenwin Fernandes	Maths	<u>Meenwin Fernandes</u>
6	2202266	Reshma Kerketta	Maths	<u>Reshma Kerketta</u>
7	2202177	Shainali Zambaulikar	Physics	<u>Shainali Zambaulikar</u>
8	2202176	Santajbani Xec	Physics	<u>Santajbani Xec</u>
9	2202275	Tanay Gorekar	Physics	<u>Tanay Gorekar</u>
10	2202253	Diya Deshpande	Maths	<u>Diya Deshpande</u>
11	2202265	Ramona Fernandes	Physics	<u>Ramona Fernandes</u>

Feedback from the Participants

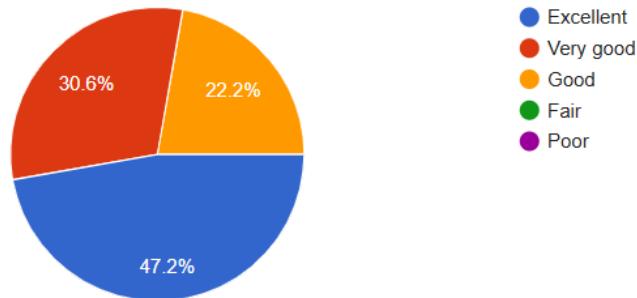
Day 1-

Session I - Infinite Horizon: India's contribution and the future of Space Exploration

How would you rate the session-I?

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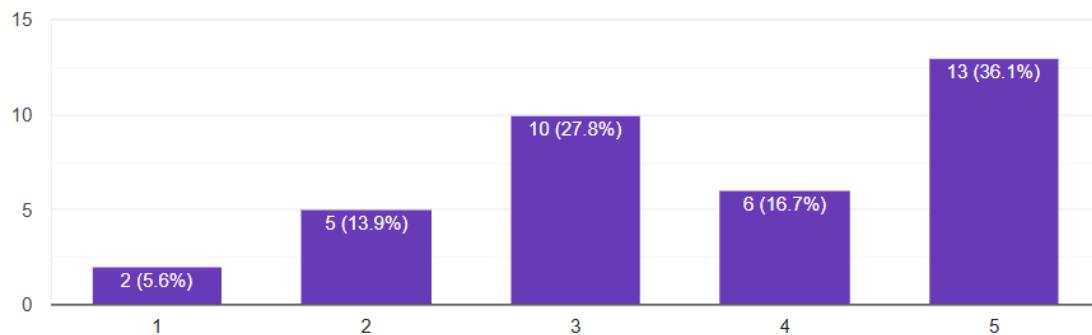
36 responses



How would you rate the workshop hospitality & arrangements made by the organizers?

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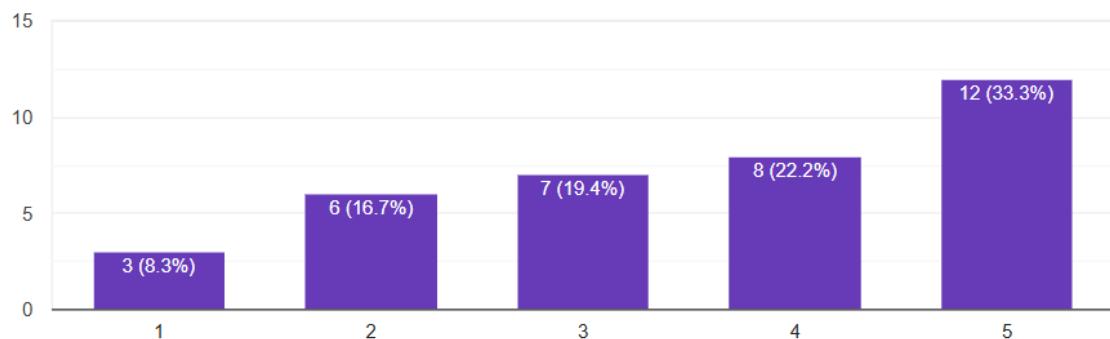
36 responses



How would you rate the workshop usefulness

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36 responses

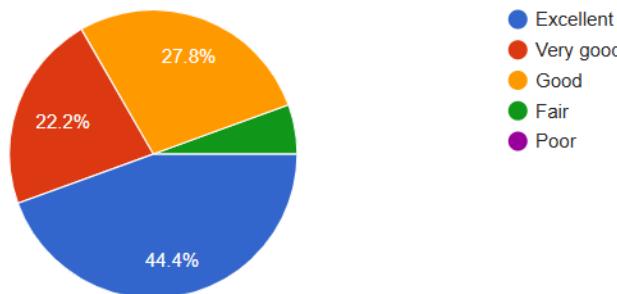


Session II - Indian Mathematics in Astronomy

How would you rate the session-II?

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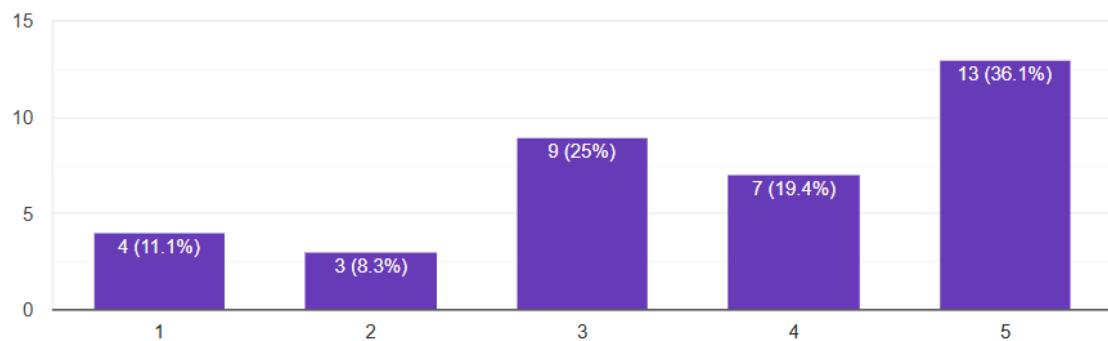
36 responses



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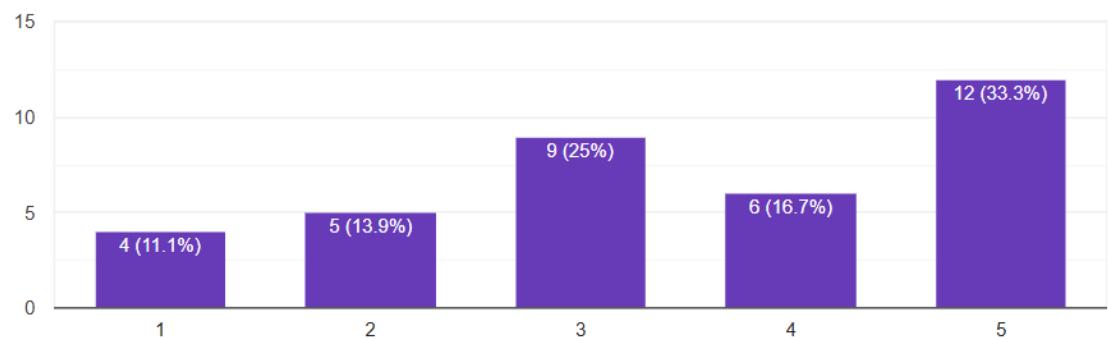
36 responses



How would you rate the workshop usefulness

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36 responses

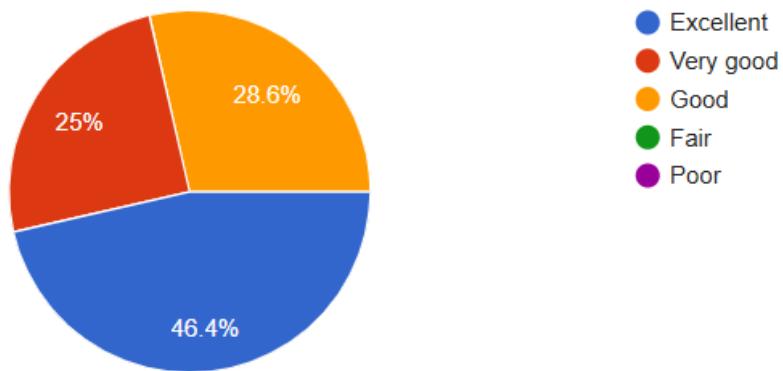


Day 2

Session I - Growth of Indian astronomy

How would you rate the session-I?

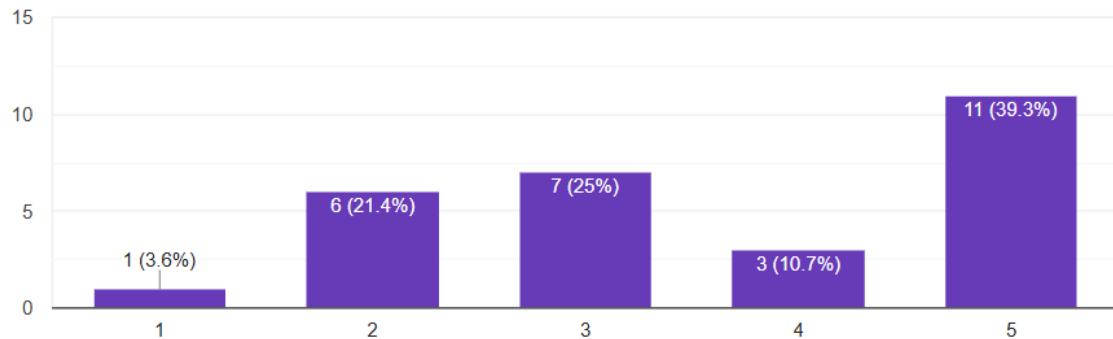
28 responses



How would you rate the workshop hospitality & arrangements made by the organizers?

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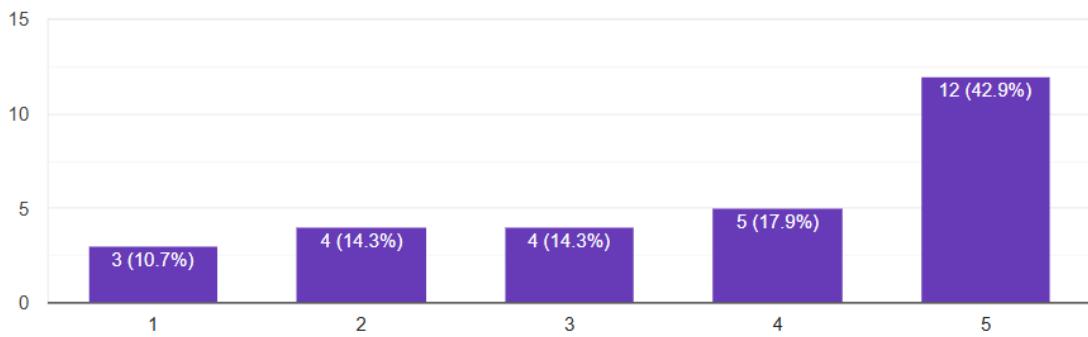
28 responses



How would you rate the workshop usefulness

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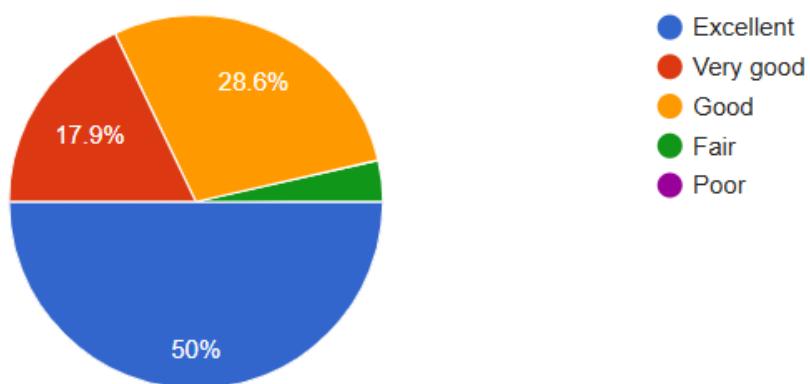
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Session II - Indian Mathematics in Astronomy

How would you rate the session-II?

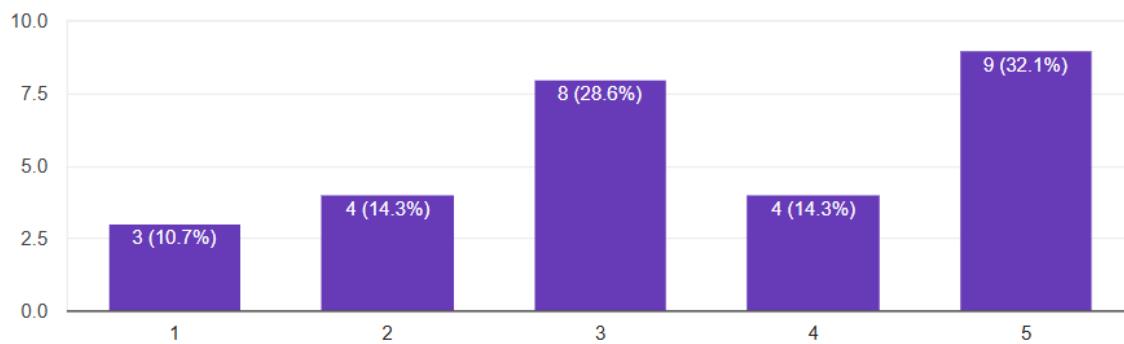
28 responses



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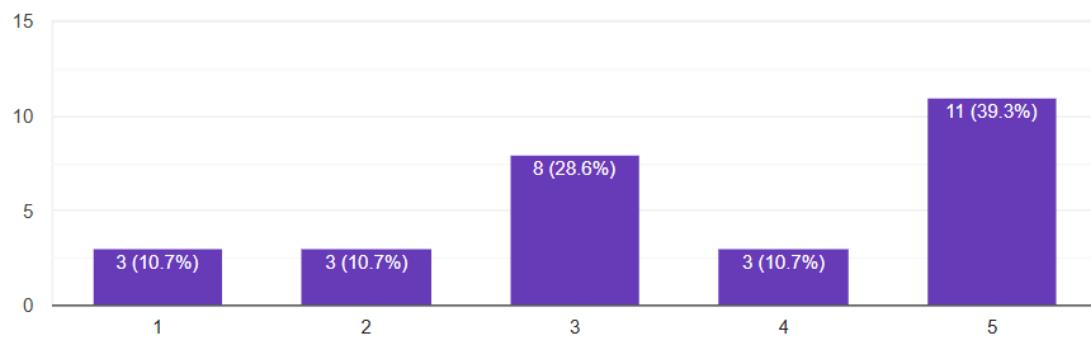
28 responses



How would you rate the workshop usefulness

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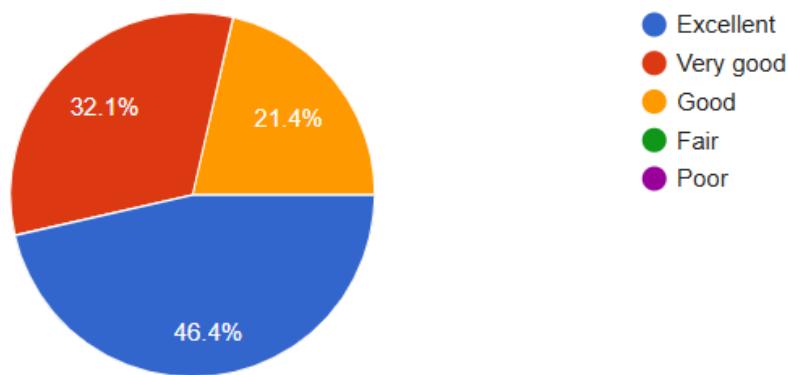
28 responses



Session III - Xray Astronomy

How would you rate the session-III?

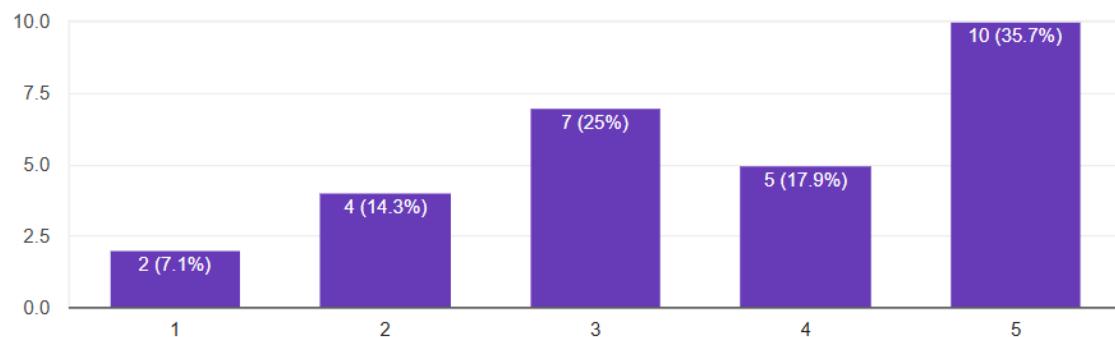
28 responses



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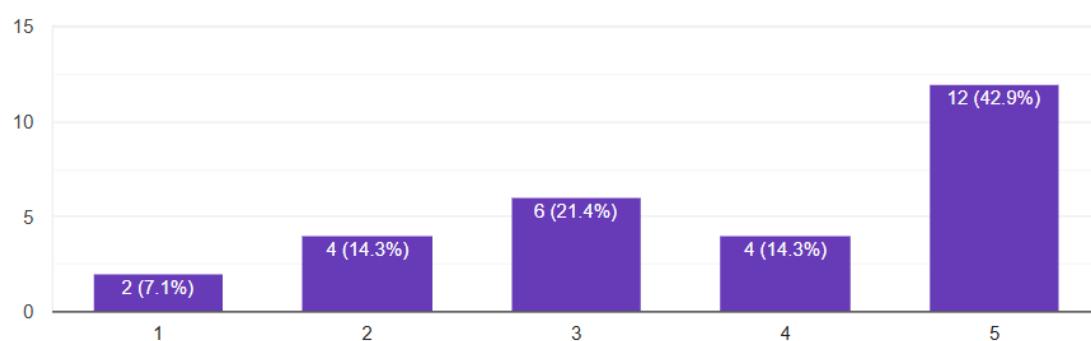
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How would you rate the workshop usefulness

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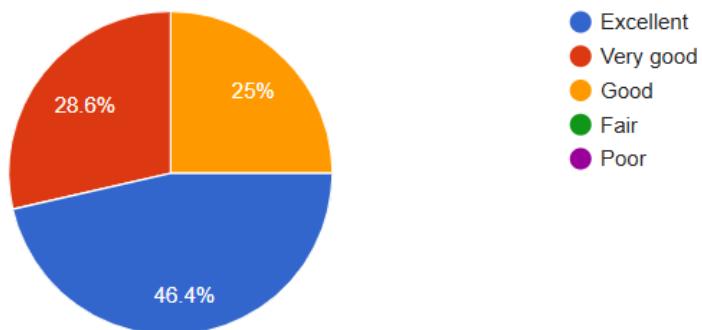
28 responses



Session IV - Recreating Bing Bang Matter on Earth

How would you rate the session-IV?

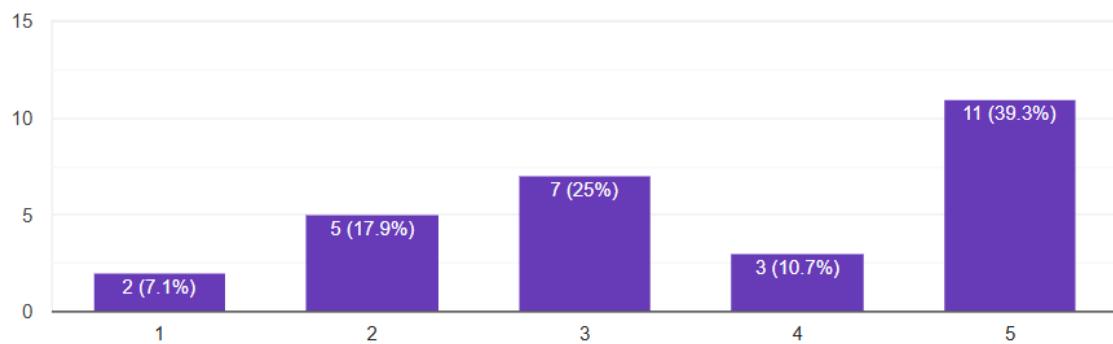
28 responses



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28 responses

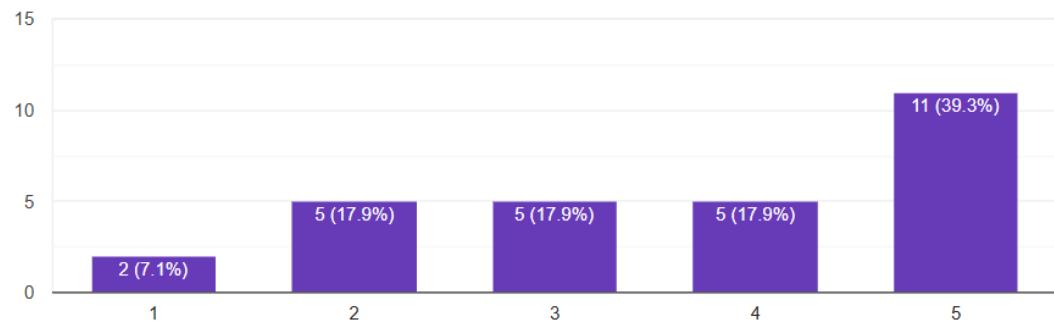
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How would you rate the workshop usefulness

28 responses

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Dr. Swati Pawar
H.o.D Physics
& Co-Convenor of the workshop
workshop

Mrs. Maria Susan Miranda
H.o.D Mathematics
& Coordinator of the

