Event Report: Webinar on Jantar Mantar and Astronomical Instruments
Date: 26 February 2025

Time: 4:30 PM – 5:30 PM

Organized by: Kalpana Chawla Space Academy (KCSA)

Mode: Online Webinar

1. Introduction

Kalpana Chawla Space Academy (KCSA) organized an informative webinar on Jantar Mantar and Traditional Astronomical Instruments on 26 February 2025. The session focused on the historical development of astronomical observatories in India and the scientific instruments used to study celestial objects. The webinar aimed to introduce students to the rich heritage of observational astronomy in India and the innovative methods used by ancient astronomers to measure time, position of stars, and planetary movements.

2. Overview of the Session

The webinar highlighted the development of astronomical observatories during the Mughal period, particularly under the patronage of Maharaja Sawai Jai Singh II, who constructed several observatories known as Jantar Mantar across India.

The speaker explained that these observatories were built to improve the accuracy of astronomical calculations and star tables. The initiative began when court astrologers disagreed on the correct astronomical tables during the reign of Mughal Emperor Muhammad Shah Rangeela, prompting Raja Jai Singh to create improved astronomical instruments and updated celestial tables.

The session also discussed the historical background of global astronomy, including the contributions of scholars such as Ulugh Beg, who built an important observatory and research center in Samarkand to advance astronomical studies.

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3. Key Concepts Covered

3.1 Jantar Mantar Observatories

Participants learned about the famous Jantar Mantar observatories constructed in different cities such as Jaipur, Varanasi, and Ujjain. These observatories consist of large-scale masonry instruments designed to measure astronomical quantities with high precision.

The session explained how these instruments helped astronomers determine celestial coordinates, time, and planetary positions long before modern telescopes became common.

3.2 Important Astronomical Instruments

The webinar introduced several instruments found in the Jantar Mantar complexes, explaining their scientific purpose and working principles.

Samrat Yantra

•A giant equinoctial sundial used to measure local time with remarkable precision.
• It consists of a triangular gnomon with quadrants on either side to measure the shadow.

Rama Yantra
•Used to measure the altitude and azimuth of celestial bodies.
• It allows astronomers to determine the position of stars and planets in the sky.

Nadivalaya Yantra
• An instrument designed to measure time based on the movement of the Sun in both hemispheres.

Digamsha Yantra
• Used to determine the azimuth or direction of celestial bodies relative to the horizon.

Shanku Yantra
• A vertical rod instrument used to determine altitude and solar position**.**

3.3 Miniaturised Jantar Mantar Models

The presentation also highlighted miniaturised models of Jantar Mantar instruments, which help students understand their working principles in educational settings. These models replicate instruments such as Samrat Yantra, Digamsha Yantra, and Nadivalaya Yantra, making them easier to demonstrate in classrooms and science exhibitions.

3.4 Traditional Indian Astronomical Instruments

The session briefly discussed other traditional instruments such as Dhruva Bhrama Yantra, which was described by the astronomer Padmanabha and used to study the region around the Pole Star.

These instruments demonstrate the deep understanding of celestial geometry and observational astronomy possessed by ancient Indian astronomers.

4. Interaction Session

The webinar included an interactive question-and-answer session where participants asked questions regarding:

• The working principles of Jantar Mantar instruments.
• The accuracy of ancient astronomical measurements.
• Differences between traditional observatories and modern telescopes.
• The historical importance of Indian astronomy.

The speaker clarified these concepts with examples and encouraged students to explore observational astronomy.

5. Learning Outcomes

Participants gained:
• Knowledge of the historical development of astronomical observatories in India.
• Understanding of major instruments used in Jantar Mantar.
• Awareness of how ancient astronomers measured time and celestial positions.
• Appreciation of India's scientific heritage in astronomy.
• Inspiration to learn more about observational astronomy and space science.

6. Conclusion

The webinar successfully highlighted the scientific significance of Jantar Mantar observatories and traditional astronomical instruments. It helped students understand how early astronomers developed innovative tools to study the universe with remarkable accuracy. The session aligned with KCSA's mission to promote scientific awareness and appreciation of India's contributions to astronomy and space science.

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KCSA

NATIONAL SCIENCE DAY SPECIAL WEBINAR

ANCIENT ASTRONOMICAL INSTRUMENTS

Thursday
26th Feb 2026

Time
04:30 PM - 5:30 PM

Venue
Hybrid

OUR EXPERT

V Sivashankara Sastry

Science/Math Communicator
Science writer, Translator
Modeller, Origamian

Here's what's in store:
India's Expanding Technological Frontier
Discover the nation's bold vision in the Digital race.

Who Should Attend?

- ✓ Young enthusiast about new technological advancement
- ✓ Want to understand Ancient Astronomy
- ✓ Academicians, Researchers,
- ✓ ParentsAcademicians, Researchers, Parents, Students

Topics Covered:

- ✓ Ancient Astronomoical Instruments
- ✓ Use of Origami in Astronomy

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