

# Jyotirvidya Parisanstha, Pune

India's First Association of Amateur Astronomers

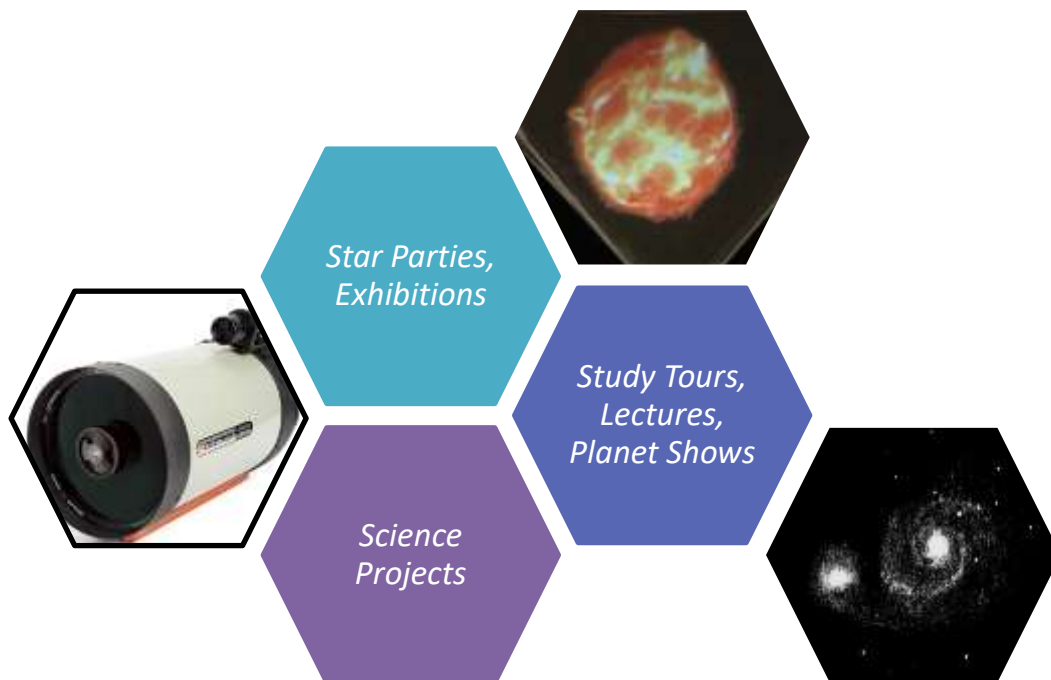
Foundation: 22 August 1944; Ganesh Chaturthi, Shuk 1866



## Annual Report

Year 2016-17

73<sup>rd</sup> Year



॥ ज्ञानस्य निर्मलं नेत्रं ज्योतिष्यकमनुत्तमम् ॥

## Jyotirvidya Parisansta, Pune

2016-17 : 73<sup>rd</sup> Year

### Annual Report (April 2016 – March 2017)

The Governing Council of Jyotirvidya Parisansta is very pleased to put forward annual report of 73<sup>rd</sup> year in the General Body Meeting. Parisansta made good progress in this year and we thank all the members of the Parisansta who made the programs a great success.

#### Welcoming the new members

In the year 2016-17, following number of people newly became member of Parisansta:

Life Members: 4

Annual Members: 139

#### Governing Council for the year 2016-17

President	Mr. Mujtaba Lokhandwala
Vice Presidents	Mr. Aniruddha Deshpande Mr. Deepak Joshee
Secretary	Dr. Sagar Gokhale
Joint Secretary	Ms. Ketaki Dave
Treasurer	Ms. Aparna Kinkar
Executive members	Mr. Shailesh Tilak Dr. Amod Rairikar Mr. Sameer Godbole Mr. Parimal Dave Mr. Amit Kadlaskar Mr. Milind Joshi Mr. Sarang Vandana Mr. Ramchandra Karanje Mr. Atharva Pathak Mr. Siddharth Birmal Mr. Omkar Gawali

## WORK REPORT IN THE YEAR 2016-17

Parisanstha members successfully organized outreach programs as well made good progress in science projects. Members worked nicely on both the fronts.

### Star parties

Monthly public star parties are the very regular program organized by Parisanstha for many years. The report of the same is as follows,

Date	Attendees
9 April 2016	128
30 April 2016	70
7 May 2016	136
5 November 2016	140
26 November 2016	60
3 December 2016	125
28 January 2017	106
4 March 2017	96



All the programs above were conducted at Abhyankar Farms, near Nasarapur Phata on Pune-Satara highway.



In general, the outline of programs was as follows,

6.00 pm to 7.00 pm	Introduction and Tea
7.00 pm to 8.00 pm	Telescopic viewing of planets, galaxies or nebulae
8.00 pm to 9.30 pm	Unaided eye stargazing (Introduction to constellations, stars and Nakshatras, etc.)
9.30 pm to 10.30 pm	Dinner
10.30 pm to 11.30 pm	Astro-movies
11.30 pm to 00.30 am	Slide show / introduction to planetarium software
00.30 am to 1.30 am	Telescopic viewing of planets, galaxies or nebulae
1.30 am to 2.30 am	Unaided eye star gazing
2.30 am to 3.00 am	Telescopic viewing of planets, galaxies or nebulae
3.00 am to 4.00 am	Astrogames
4.00 am to 4.30 am	Tea
4.30 am to 5.30 am	Unaided eye stargazing and Telescopic viewing of planets etc.

All these programs were successfully organized with the help of following members: Mr. Sarang Vandana, Ms. Aparna Kinkar, Mr.

Aniruddha Deshpande, Mr. Omkar Gavali, Ms. Bhumika Radore, Mr. Atharva Pathak, Mr. Nilay Mokashi, Mr. Milind Joshi, Ms. Isha

Patankar, Ms. Harsha Kulkarni, Ms. Shruti Deshpande, Mr. Siddharth Birmal, Mr. Amit Kadlaskar, Mr. Ramchandra Karanje, Ms. Madhavi Patankar, Mr. Mayuresh Wagh, Mr. Vishwajeet Anjali, Mr. Sushen Joshi, Ms. Rucha Naniwadekar, Mr. Shubham Kulkarni, Mr. Sujay Vaidya, Ms. Harshada Kavi, Ms. Snehal Padhye, Mr. Vedant Shende, Ms. Archana Dash, Ms. Avantika Iyengar, Mr. Prabhanjan Bongarde, Mr. Nisarg Ingole, Mr. Siddharth Kamat, Mr. Vivek Shende, Ms. Pooja Naniwadekar, Mr. Parag Kulkarni.



In addition to these programs, following invitation star parties were conducted by Parisanstha:

Date	Invitee	Place	Attendance
9 April 2016	Manali Agro Farm	Manali Agro Farm, Naigao	35
11 April 2016	Siemens PLM Software	Hinjewadi (Phase II)	45
12 April 2016	Agney Gurukul	Arangaon, Ahmednagar	300
13 April 2016	Bharat Gyan Vigyan Samudaay	Chakan	150
23 April 2016	Pune Marathi Granthalaya (children's summer camp)	Pune Marathi Granthalaya	90
30 April 2016	Rivers and Ridges	Bhivri (Bopdeo Ghat)	45
2 May 2016	Aakar Foundation summer camp	Nimbalkar Wadi (Katraj)	40
7 May 2016	Giridarshan group	Dharmaveergad (Pedgaon)	60
11 May 2016	Dikshant Global School	Zirakpur (Chandigarh)	220
13 May 2016	'LOL Little Ones Learn'	Kothrud	55
13 May 2016	Maulana Azad Association	Kondhwa	100 +
14 May 2016	Rivers and Ridges	Bhivri (Bopdeo Ghat)	16
14 May 2016	Manali Agro Farm	Manali Agro Farm, Naigao	40
25 May 2016	Hi-Tech Institute of Technology	Waluj (Aurangabad)	100 +
9 November 2016	Shivsena	Bopodi	300
10 November 2016	Shivsena	Aundh	150
10 November 2016	National Institute of Oceanography	Goa	150
19 November 2016	Delhi Public School	Kondhwa	250
30 November 2016	Mind Tree School	Panjokhra, Ambala	230
1 December 2016	Dikshant Global School	Zirakpur (Chandigarh)	60
6 December 2016	Symbiosis School	Symbiosis School, Prabhat Road	110
17 December 2016	Rotary Club of Talegaon Dabhade	EEC, Talegaon	80
21 December 2016	NSS camp of D. Y. Patil Institute of Engineering & Technology, Ambi	Kothruni, Pavana Nagar	100

4 January 2017	NSS camp of Garware College	Manjai Asani	100
21 January 2017	Rivers and Ridges	Bhivri (Bopdeo Ghat)	40
21 January 2017	General Mills Inc.	Mahabaleshwar	20
4 February 2017	Shikshan Hakka Manch	Mominpura, Pune	180
4 March 2017	Sahyadri School	Wada (Chas)	100
25 March 2017	Rivers and Ridges	Bhivri (Bopdeo Ghat)	30



Following members guided the participants in the invited star parties: Mr. Sarang Vandana, Mr. Omkar Gavali, Ms. Bhumika Radore, Mr. Atharva Pathak, Mr. Milind Joshi, Ms. Harsha Kulkarni, Mr. Siddharth Birmal, Mr. Amit Kadlaskar, Mr. Ramchandra Karanje, Ms. Madhavi Patankar, Mr. Vishwajeet Anjali, Mr. Sushen Joshi, Ms. Rucha Naniwadekar, Mr. Shubham Kulkarni, Mr. Sujay Vaidya, Mr. Vedant Shende, Mr. Yogesh Kane, Ms. Archana Dash, Ms. Pooja Naniwadekar, Mr. Parag Kulkarni.

All the invited Star Parties were managed well by Mr. Sarang Vandana.



In the report year, Parisanstha procured Go-To type equatorial mount: Skywatcher EQ-3 specially for star parties. The optical tube mounted on this mount was 6 inch refractor or 5 inch Cassegrain OTA.



### Planet shows and open programs

Since last few years, Parisanstha organizes free programs for citizens of Pune from Kesariwada. The programs organized in year 2016-17 were as follows:

Date	Event	Place	Visitors
9 May 2016	Mercury's transit over Sun	Dnyan Prabodhini	400
13 May 2016	Zero Shadow Day & Sunspots show	Tilak Smarak Mandir	50
28 May 2016	Saturn and Mars at opposition	Kesariwada	300
15 November 2016	Occultation of Aldebaran	Kesariwada	60
9 January 2017	Occultation of Aldebaran	Kesariwada	40
16 February 2017	Iridium Satellite Flare	Kesariwada	60
20 February 2017	Crescent Venus Show	Kesariwada	100

On Monday, 9th May 2016 we observed planet Mercury travelling over the disc of Sun. In astronomical language this event is known as Transit. Mercury touched Sun's disc on 4.42 PM IST and was completely over Sun's disk within three minutes. On 8.27 PM IST, it was close to little south of Sun's centre. Transit ended by 12.12 AM IST i.e. in midnight. In Pune, citizens enjoyed telescopic viewing of event till sunset i.e. till 6.59 PM IST. Parisanstha made available its seven telescopes with solar filter to observe this event from Dnyan Prabodhini School, Pune and projection of event was arranged on big screen by connecting camera to 8 inch reflector telescope.



On May 13, in city of Pune, Sun passes exactly through zenith i.e. point in the sky exactly overhead at 12.31 pm IST. At this moment, if

we try to observe shadow of a pillar exactly perpendicular to ground, or similar thing, then you will see that shadow is disappeared for few moments. We celebrate this day as a Zero Shadow Day for Pune. The public program for same was held at Tilak Smarak Mandir. Zero Shadow was demonstrated to common public and apparent movement of Sun in sky was explained. Sunspots were also shown through telescopes to people during this program.



Mars was in opposition with Sun on 22 May 2016 whereas Saturn was in opposition on 3 June 2016. On this occasion, Parisanstha organized open program at Kesariwada on 28 May 2016 and citizens observed the planets through 6 and 8 inch telescopes. Planetary images were also projected on screen using

Kesariwada JVP Observatory's 11 inch telescope.

Moon occulted Aldebaran star (*Rohini Nakshatra* star) on 15 November 2016 and 9 January 2017. Parisanstha organized a program for Pune citizens at Kesariwada on both the days; wherein event was projected on big screen using Kesariwada JVP Observatory's 11 inch telescope.



Iridium are the communication satellites and when sunlight is reflected from their solar panels which we can see from earth. Sometimes this light is as bright as Venus or even brighter and is called as Iridium flare. One such event was shown to citizens on 16 February 2017 from Kesariwada. More information on artificial satellites were given to people at this time.

Since Venus is inner planet for earth, we can see crescent phase of Venus. A program was organized at Kesariwada on 20 February 2017 to show phases of Venus through telescopes.



Following members of Parisanstha volunteered to make these programs a big

success: Mr. Sarang Vandana, Ms. Aparna Kinkar, Mr. Aniruddha Deshpande, Mr. Omkar Gawali, Ms. Bhumika Rathore, Mr. Atharva Pathak, Mr. Nilay Mokashi, Mr. Milind Joshi, Ms. Isha Patankar, Ms. Harsha Kulkarni, Ms. Shruti Deshpande, Mr. Siddharth Birmal, Mr. Amit Kadlaskar, Mr. Ramchandra Karanje, Ms. Madhavi Patankar, Mr. Mayuresh Wagh, Mr. Vishwajeet Anjali, Mr. Sushen Joshi, Ms. Rucha Naniwadekar, Mr. Shubham Kulkarni, Mr. Sujay Vaidya, Ms. Harshada Kavi, Ms. Snehal Padhye, Mr. Vedant Shende, Mr. Nisarg Ingole, Ms. Archana Dash, Ms. Avantika Iyengar, Mr. Prabhanjan Bongarde, Mr. Siddharth Kamat, Mr. Vivek Shende, Ms. Pooja Naniwadekar, Mr. Parag Kulkarni, Mr. Abhay Dashrath, Mr. Sameer Godbole, Mr. Deepak Joshee, Mr. Amod Rairikar, Ms. Ketaki Dave, Ms. Rethika Deshmukh, Mr. Mandar Naravane, Mr. Srujan Nandede, Mr. Prathamesh Kale.



### Lectures

On 24 November 2016, Prof. Helen Masan, OBE (Order of the British Empire) delivered a lecture at Parisanstha. On this occasion, models of Aditya space craft, Interiors of Sun and Sun spots were presented to Prof. Masan. These models were made by Parisanstha members for exhibition: "Āditya – explore our sun".



In report year, four lectures were organized for Parisanstha members:

Date	Lecturer	Subject	Venue	Attendance
24 November 2016	Dr. Helen Masan, OBE, Professor, Cambridge University	Our Dynamic Sun	Tilak Smarak Mandir	100
25 November 2016	Mr. Suhas Gurjar, Former President, Jyotirvidya Parisanstha	Occultations	Dhanvantari Sabhagruha	30
5 December 2016	Mr. Nilesh Oak	Applied Astronomy: Lessons from Mahabharata & Ramayana	Dhanvantari Sabhagruha	60
9 December 2016	Prof. P. K. Ghanekar, Former Professor, Abasaheb Garware College	Impact Crater of Lonar	Dhanvantari Sabhagruha	70



### Study Tours

Following study tours were conducted by Parisanstha in the report year.

Date	Place	Participants
17-18 December 2016	Lonar Impact Crater	18
4 February 2017	GMRT & IGO	21



In Lonar study tour, participants visited places like Sharangadhar Mandir at Mehekar, Lonar main crater, temples in the crater, Dharatirtha Mandir, Daityasudan Mandir, Ambar crater, Sleeping Hanuman temple, etc. Mr. Sudhakar Bugdane shared the scientific information about these places. Participants also studied magnetic stones formed due to meteorite impact, highly salty water in the Lonar Lake and biodiversity in the crater.

During the tour to Khodad & Girawali, participants visited Giant Meterwave Radio Telescope (GMRT) at Khodad and IUCAA Girawali Observatory (IGO) at Girawali. Mr. Divya Oberoi from NCRA explained working of Radio telescope, radio imaging etc. to the participants; whereas during visit to IGO, working and imaging with 2 meter telescope was explained to participants.





Efforts taken by Mr. Amit Kadlaskar for organization of these study tours are highly

appreciated. Also following members supported him in the organization: Mr. Aniruddha Deshpande and Ms. Aparna Kinkar.

### Basic Course in Practical Astronomy

This year Parisanstha conducted Basic Course in Practical Astronomy during 10 to 23 May 2016 at Bhandarkar Oriental Research Institute. There were 38 participants in this course. The course consisted of following lectures:

Date	Topic	Lecturer	Place
10 May 2016	Introduction	Mr. Aniruddha Deshpande, Vice President, JVP	Kesariwada JVP Observatory
11 May 2016	History of Astronomy	Mr. Shekhar Phatak, Former President, JVP	Bhandarkar Oriental Research Institute
12 May 2016	Positional Astronomy and Time – 1	Mr. V. V. Sovani, Former President, JVP	Bhandarkar Oriental Research Institute
13 May 2016	Positional Astronomy and Time – 2	Mr. V. V. Sovani, Former President, JVP	Bhandarkar Oriental Research Institute
14 May 2016	Overnight Observational Session	Mr. Deepak Joshee, Vice President, JVP	Abhyankar Farms
14 May 2016	Instruments for Astronomical Observations	Dr. Sagar Gokhale, Secretary, JVP	Abhyankar Farms
14 May 2016	Software for Astronomical Studies	Mr. Nilay Mokashi, Member, JVP	Abhyankar Farms
15 May 2016	Solar System	Ms. Ketaki Dave, Joint Secretary, JVP	Bhandarkar Oriental Research Institute
16 May 2016	Astro-Photography	Mr. Shekhar Phatak, Former President, JVP	Bhandarkar Oriental Research Institute
17 May 2016	Comets and Meteors	Mr. Sarang Vandana, Executive committee Member, JVP	Bhandarkar Oriental Research Institute
18 May 2016	Eclipses, transits, occultation and phenomena in Astronomy	Mr. Deepak Joshee, Vice President, JVP	Bhandarkar Oriental Research Institute
19 May 2016	Variable Stars	Mr. Abhay Dashrath, Lecturer, D. Y. Patil College of Engineering	Bhandarkar Oriental Research Institute
20 May 2016	Cosmology	Mr. Mujatoba Lokhandawala, President, JVP	Bhandarkar Oriental Research Institute
21 May 2016	Multiwavelength Astronomy	Mr. Sameer Dhurde, Science Popularization Officer, IUCAA	Bhandarkar Oriental Research Institute
23 May 2016	Visit to Jyotirvidya Kesariwada Observatory and Certificate distribution	Mr. Aniruddha Deshpande, Vice President, JVP	Kesariwada JVP Observatory



Jyotirvidya Parisanstha members: Mr. Omkar Gavali, Ms. Bhumika Rathore, Mr. Sarang Vandana, Mr. Siddharth Birmal, Mr. Deepak Joshee, Mr. Aniruddha Deshpande, and Ms. Aparna Kinkar helped in successful organization of the course.

**Astronomical Exhibition: Āditya – Explore our Sun**

Jyotirvidya Parisanstha had organized astronomical exhibition between 26-28 August 2016 on “Āditya – Explore Our Sun” at Raja Ravi Varma Art Gallery, Jawaharlal Nehru Cultural Center, opposite Mahatma Phule museum, Ghole road, Pune.



Dr. Somak Raychaudhury, Director IUCAA (Inter University Center for Astronomy & Astrophysics) inaugurated this exhibition on 26th August 2016 at 10 AM. Mr. Sameer Dhurde, Science popularization officer, IUCAA and Dr. Neeruj Mohan Ramanujan, Scientist, NCRA were also present during inaugural function. This exhibition remained open for all

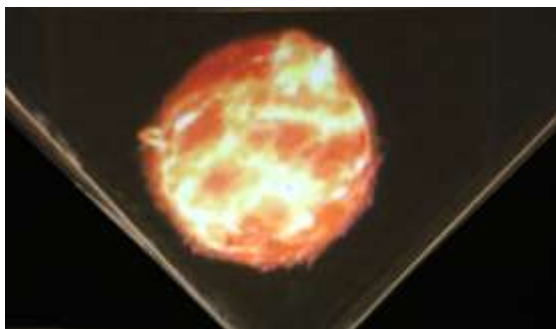
during 26-28 August 2016 between 9 am to 8 pm. Around 1500 people visited the exhibition.

Sun is our own star – star of our planetary system is being studied since ancient days.



Study of Sun is important to us because of following reasons – 1) Life on Sun is dependent on Sun and how small activities happening in sun affects life system 2) How events happening in Sun’s atmosphere affect artificial satellites and other electrical appliances. E.g. they can change orbit of satellite or even satellites can go bad because of solar ejections 3) Sun is the closest star to us and by studying Sun, we can get more information about other stars as well.





In the exhibition arranged by Parisanstha, one could get information about structure of Sun, it's birth, Sun's death, human attempts made till date to understand Sun, solar observatories, space missions to study Sun. One could also get information through information charts, audio visuals as well



as number of models like – structure of Sun, Sunspots, Northward and Southward movement of Sun, Eclipses, Sundials and space missions to study sun like SOHO, Aditya, etc. One could also get to know about ISRO's upcoming mission: "Aditya" through its model. Floating 3D Sun was big attraction of this exhibition.



At this time, Dr. Somak Raychaudhury stated importance of study of Sun. Sun is important milestone in study of universe. Earlier times Sun was considered to be very important in universe, but with more studies, it was revealed that sun is an ordinary star in the universe. Just same as sun, other stars are also having planetary systems. Because Sun is very close star to us, we can study it in details and can relate to other stars in universe. Dr. Raychaudhury further said that today we know the Sun much more than what we were knowing even 20 years ago. We know about Sun even more than Earth and this is the very right time when Jyotirvidya Parisanstha has organized this exhibition to spread knowledge regarding Sun.



Volunteers worked really hard through entire July & August months to make models and posters. Following members of Parisanstha worked very hard to make this exhibition a big success: Mr. Atharva Pathak, Mr. Hari Shankar, Mr. Ramchandra Karanje, Mr. Omkar Gavali, Mr. Siddharth Birmal, Ms. Rethika Deshmukh,



Ms. Shruti Deshpande, Ms. Harsha Kulkarni, Mr. Amit Kadlaskar, Mr. Sarang Vandana, Ms. Madhavi Patankar, Mr. Prathamesh Kale, Mr. Chinmay Ekbote, Ms. Bhumika Rathore, Ms. Prajakta Khaty, Mr. Mandar Naravane, Ms. Vaishali Sawant, Mr. Sujay Vaidya, Ms. Harshada Kavi, Mr. Milind Halbe, Ms. Monika Gundecha, Mr. Shubham Kulkarni, Mr. Sushen Joshi, Mr. Aniket Kelkar, Mr. Vedant Sole, Ms. Sakshi Shejole, Ms. Sonal Kelavadar, Mr. Vishwajeet Anjali, Ms. Isha Patankar, Ms. Shalaka Godbole, Mr. Vivek Shende, Mr. Vedant Shende, Mr. Mayuresh Wagh, Ms. Pooja Naniwadekar, Mr. Srujan Nandede, Ms. Srushti Pardhi, Mr. Milind Joshi, Dr. Amod Rairikar, Mr. Sameer Godbole, Ms. Aparna Kinkar, Mr. Suhas Gurjar, Mr. Prakash Tupe, Mr. Abhay Dasharath, Mr. Deepak Joshi, Mr. Aniruddha Deshapande and Mr. Sagar Gokhale. Mr. Prakash Tupe donated ₹ 4000 for the organization of this exhibition.



This exhibition organized by Parisanstha was then also exhibited in some colleges in and around the Pune city.

Date	Place	Students visited
23 September 2016	Dr. D. Y. Patil College of Engineering, Akurdi	900
29-30 September 2016	Fergusson College, Pune	800
17 January 2017	Modern College, Pune	200
23 January 2017	Nowrosjee Wadia College, Pune	200



For these exhibitions, members of Parisanstha trained students from respective college and then respective college students exhibited, explained models and posters in the exhibition.



Following members worked hard to make these exhibitions successful: Mr. Atharva Pathak, Ms. Shruti Deshpande, Mr. Sarang Vandana, Mr. Sujay Vaidya, Ms. Sakshi Shejole, Mr. Siddharth Birmal, Mr. Sameer Godbole.

### Astronomical Quiz: “Āditya – Explore our Sun”

Along with the exhibition organized by Parisanstha at Jawaharlal Nehru Cultural Centre, Parisanstha also organized an Astronomical Quiz Competition on 25 August 2016 for school and college students. This quiz was based on astronomical observations and astrophysics.



This was organized in two age groups: (1) School students up to 10<sup>th</sup> Standard (2) University students (junior and senior college students). 126 students from 37 schools and 26 colleges participated in this competition. Mr. Sameer Dhurde, Science Popularization Officer, IUCAA worked as judge for the quiz.



In this competition, in school student's group students of Mukhtangan English School were winners whereas students of DES Secondary School were runner ups. In college student's group, students from Fergusson College stood first and students from Arihant Junior College were runner ups. Prizes to the winners were distributed in the hands of Dr. Somak Raychaudhury, Director, IUCAA on 26<sup>th</sup> August 2016. There were cash prizes to the winners of ₹ 500 each whereas prize for runner ups was ₹ 250 each.



The quiz program was organized by JVP members: Mr. Sarang Vandana, Mr. Prathamesh Kale, Mr. Sujay Vaidya, Mr. Hari Shankar, Mr. Milind Joshi, Mr. Omkar Gawali, Ms. Madhavi Patankar, Ms. Bhumika Rathore, Mr. Mayuresh Wagh, Mr. Vishwajeet Anjali, Mr. Aniruddha Deshpande, Mr. Mujtaba Lokhandwala.

### Participation in National Level Programs

- Mr. Atharva Pathak, member, JVP delivered a lecture at National Institute of Oceanography on 10 November 2016 on the topic, 'Amateur Astronomy Activities and Astrophotography Basics'. 150 students of the institute were present during the program.



- Vigyan Prasar division of Department of Science and Technology, Government of India had organized a program, "India International Science Festival - 2016" during 7 to 10 December 2016 at New Delhi. During this program, Vigyan Prasar invited Parisanstha to carry out star gazing program for the invitees. JVP members, Mr. Shubham Kulkarni and Mr. Sujay Vaidya conducted the star gazing program for three days when 3000 people visited the sky show.
- 10<sup>th</sup> Astronomy and Astrophysics International Olympiad was organized at Bhubaneshwar during 17 to 20 December 2016. Vigyan Prasar division of Department of Science and Technology, Government of India invited Jyotirvidya Parisanstha to be part of organizing of "Astronomy Festival" during the Olympiad. Other organizers were: National Institute of Science Education and Research (NISER), Bhubaneshwar, Vigyan Prasar, Astronomical Society of India (ASI – POEC), Homi Bhabha Center for Science Education, Mumbai, Pathani Samanta Planetarium, Bhubaneshwar and Nehru planetarium, New Delhi. Parisanstha organized an exhibition, "Āditya – Explore our Sun" for the students participated in the Olympiad.



Following models were exhibited during the exhibition: structure of Sun, Sunspots, Northward and Southward movement of Sun, Eclipses, space missions to study sun like SOHO, Aditya, Sundials, etc. 1500 students visited this exhibition. Mr. Sameer

Godbole, Mr. Atharva Pathak, Ms. Shruti Deshpande, Ms. Harsha Kulkarni and Ms. Archana Dash participated on behalf of Jyotirvidya Parisanstha in this event.



### National Science Day

We celebrate National Science Day on 28<sup>th</sup> February. On this occasion, Inter University Center for Astronomy and Astrophysics (IUCAA) and National Center for Radio Astronomy (NCRA)- Giant Meterwave Radio Telescope (GMRT) organized an open program for general public and invited Jyotirvidya Parisanstha members to guide the visitors. On this occasion, Parisanstha members had made model of "Laser Interferometer Gravitational Wave Observatory" (LIGO) that IUCAA is going to erect in India. This was exhibited at IUCAA science day. Members also made model to explain Einstein's concept of "Space Time Curvature" from his theory of relativity.



Members also carried out star gazing session in the evening of 28<sup>th</sup> February. Around 10,000 citizens of Pune visited this program.



Following members of Parisanstha volunteered for this program: Mr. Sushen Joshi, Mr. Sameer Godbole, Mr. Ramchandra Karanje, Mr. Parimal Dave, Ms. Snehal Padhye, Ms. Kranti Chaudhari, Mr. Shubham Kulkarni, Mr. Vishwajeet Anjali, Mr. Omkar Gawali, Mr. Sarang Vandana, Mr. Prabhanjan Bongarde, Ms. Rithika Deshmukh, Mr. Siddharth Birmal, Ms. Monika Gundecha, Ms. Harsha Kulkarni, Ms. Ketaki Dave, Mr. Aniruddha Deshpande.



Science day at GMRT was celebrated for two days: 28 February and 1 March 2016. Following models were exhibited on behalf of Parisanstha during this event: Samrath Yantra, Nadivalay Yantra and Chakra Yantra at Jantar Mantar, model showing how eclipses happens, how we see lunar phases and how we observe seasons on earth. Around 20,000 people in different age group visited this program. Parisanstha members, Ms. Archana Dash, Mr. Srujan Nandede and Ms. Harshada Kavi guided the visitors.



### Other programs

- On 15<sup>th</sup> July 2016 Astro-Club was started at Air Force School. Mr. Nilay Mokashi, member of Parisanstha was present on this occasion. On 22<sup>nd</sup> July, Mr. Mujtaba Lokhandwala, President of Parisanstha conducted a workshop for students of Astro-Club. Around 100 students participated in the workshop.
- Mr. Sarang Vandana delivered a lecture on topic, "Supermoon" at Orchid School, Baner on 11 November 2016. 300 students of the school were present for the lecture.
- On 14 December 2016, Parisanstha organized a program to observe Geminids Meteor Shower in association with Giridarshan. 50 members of Giridarshan participated in this program conducted at Sinhagad. Mr. Ramchandra Karanje and Mr. Sarang Vandana were present on behalf of Parisanstha.
- A model of Laser Interferometer Gravitational Wave Observatory (LIGO) which is being constructed by IUCAA was made by members of Parisanstha. The model is now permanently displayed at IUCAA.



- Programs were organized for students of Unschool Preschool at Baner on 25 January and 5 March 2015. Mr. Aniruddha Deshpande, Mr. Deepak Joshee, Mr. Sarang Vandana, Mr. Omkar Gawali, Ms. Harsha Kulkarni and Mr. Vedant Shende conducted following program on 25 January 2016: Star gazing session, planetary show through telescope and artificial satellite show. On 5 March 2016, Mr. Sarang Vandana, Mr. Parag Kulkarni and Mr. Siddharth Birmal showed sun spots, Venus and Moon through telescope.

### Book and telescope library

Parisansta has an astronomical book library for many years as well as telescope library from last three years. Presently book library has 159 Marathi books and 425 English books; issues of two periodicals, "Sky and Telescope" and "Astronomy". In the telescope library, Parisansta has made available five 4 inch and 6 inch telescopes and one small radio telescope for solar observations. The list of books in the library is made available on the JVP website. In the report year, regular members of book library were nine; whereas three members took benefit of the telescope library facility.

### Social networking

- Mr. Sagar Gokhale, Mr. Deepak Joshee and Mr. Atharva Pathak maintained website of Parisansta ([www.jvp.org.in](http://www.jvp.org.in)) regularly throughout the year.
- Parisansta started using a mobile app viz. Whatsapp to communicate with members and share with them the information about programs of Parisansta. Mr. Sarang Vandana carry out this activity. A Google Group is also active to communicate information of upcoming programs to members of Parisansta.

- On the community site Facebook, Parisansta runs a group named "JVP ज्योतिर्विद्या परिसंस्था" and a page named "Jyotirvidya Parisansta". This group and a page are very active and regular discussions occur in the group on various activities of Parisansta and various astronomical events. There are more than 2900 members of group, "JVP ज्योतिर्विद्या परिसंस्था".
- Twitter handle of Jyotirvidya Parisansta was activated this year. Mr. Sarang Vandana & Mr. Deepak Joshee are handling this activity. There are more than 251 followers of Jyotirvidya Parisansta on Twitter.

### Jyotirvidya Kesariwada Observatory report

Parisansta's 10" telescope was installed at Kesariwada and for last four years, we conducted various scientific observations using the telescope and Canon 7D setup. Since Kesariwada is located in the heart of the city, this area is highly light polluted. This was introducing some errors in the variable star observations. To rectify these errors, last year Parisansta also erected dome for the telescope. To further enhance the capability, on 8 May 2016, Parisansta procured new 11 inch Schmidt Cassegrain type optical tube assembly: Celestron Edge HD 1100 XLT. The equatorial Go To mount, Skywatcher EQ6 Pro which was being used for 10 inch telescope, is also being used for new 11 inch OTA.





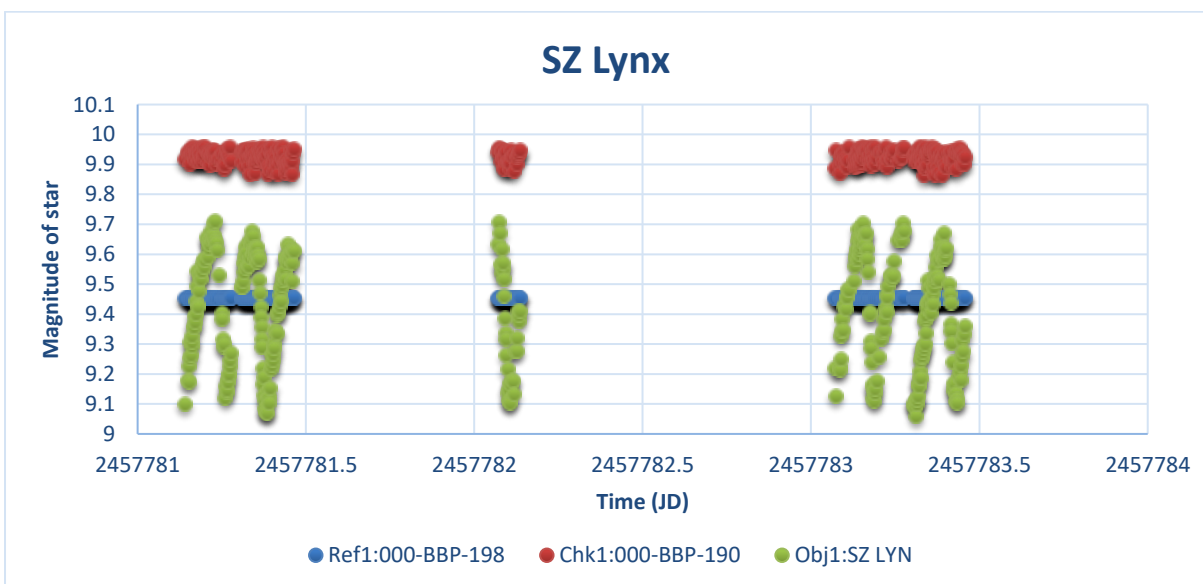
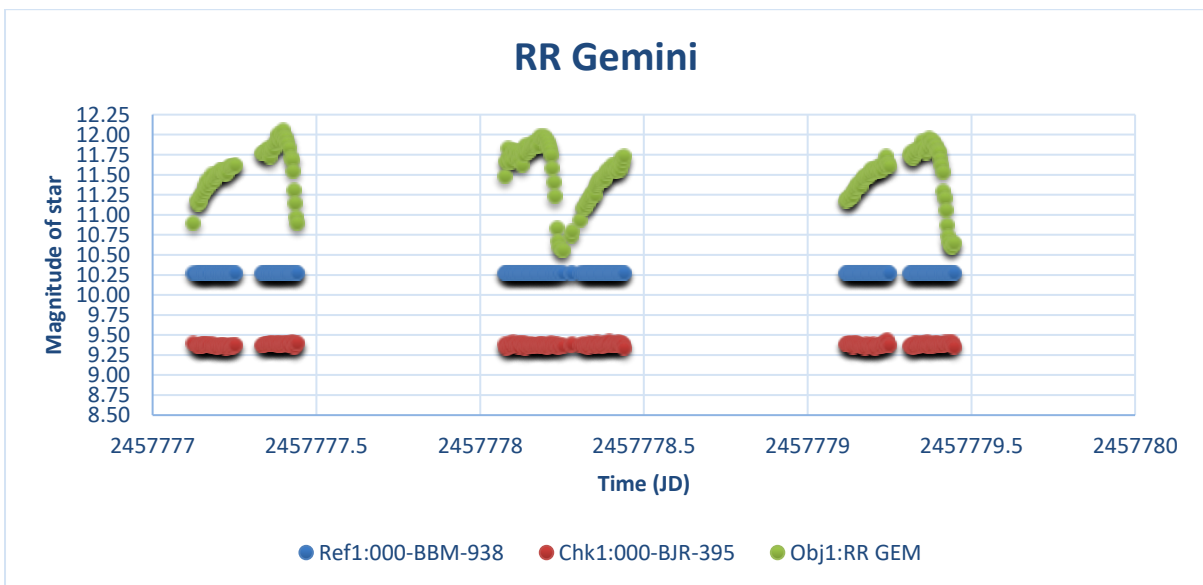
Following observations were conducted in the report year:

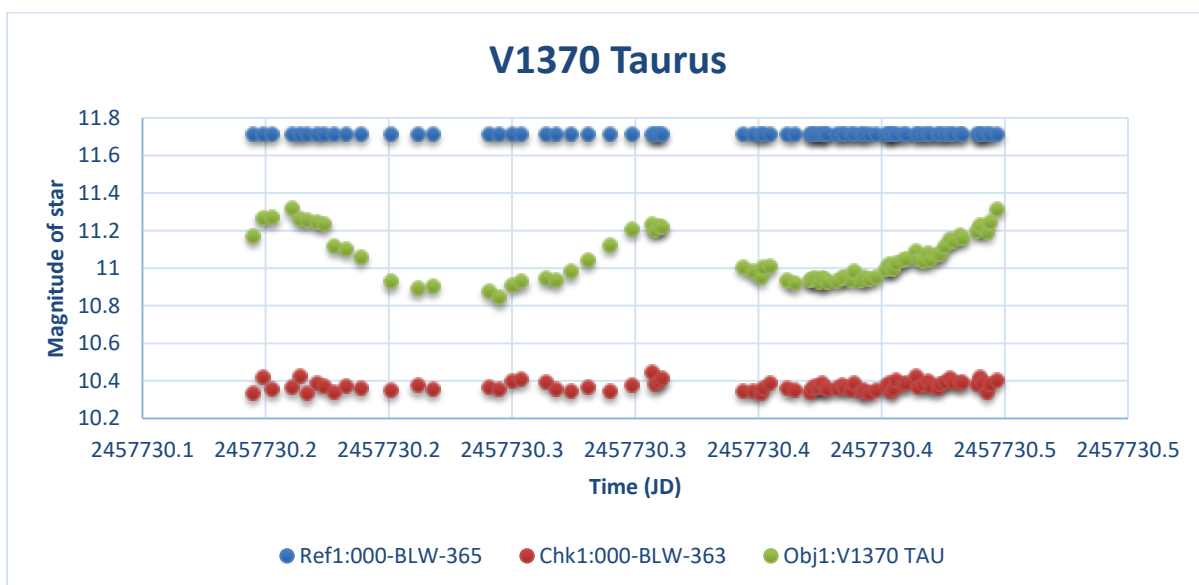
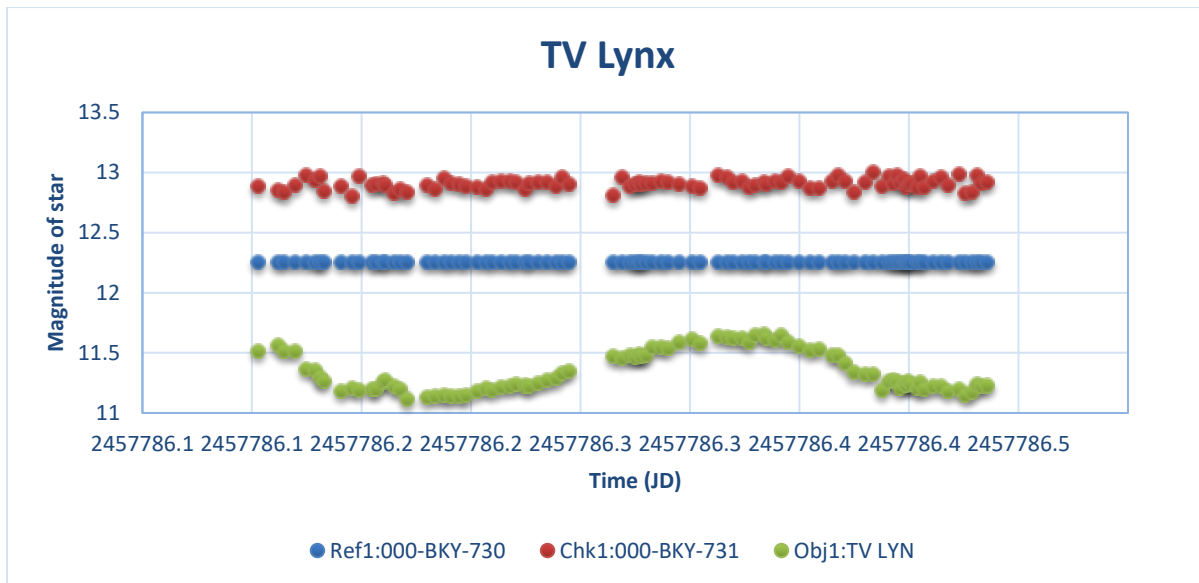
Object	Object type	Dates of Observations	Comment
Jupiter	Planet	8 May 16, 10 May 16, 6 Oct 16	Photography, Video shooting & image stacking
DY Her	Variable Star	21 May 16, 15 Jun 16, 16 Jun 16	Calibration Images, Tricolor images
M82	Galaxy	29 May 16	
Sco 2016	Nova	14 Jun 16, 15 Jun 16	AAVSO Alert
W Uma	Variable Star	15 Jun 16	
M4	Globular cluster	15 Jun 16	
M13	Globular cluster	15 Jun 16	
Saturn	Planet	17 Jun 16	
	Miscellaneous	2 Nov 16	Sky survey trial
NGC objects between 00 to 01 RA	NGC objects (Galaxies): 67 in total	22 Oct 16, 2 Nov 16, 3 Nov 16, 7 Nov 16, 8 Nov 16, 12 Nov 16, 23 Nov 16, 27 Nov 16, 29 Nov 16, 3 Jan 17, 4 Jan 17, 5 Jan 17	Sky survey for suspected activity
NSV 15707	Suspected variable star	28 Oct 16, 2 Nov 16, 3 Nov 16	
FO Aqr	Variable star	12 Nov 16	
V1370 Tau	Variable star	7 Dec 16, 22 Feb 17	B.Sc. Project
		20 Dec 16, 22 Dec 16, 23 Dec 16	Occultation exercise
TZ Aur	Variable star	10 Oct 16, 11 Jan 17	
EM Aur	Variable star	13 Jan 17	
RR Gem	Variable star	23 Jan 17, 24 Jan 17, 25 Jan 17	Wadia Collage M.Sc. Project

SZ Lyn	Variable star	27 Jan 17, 28 Jan 17, 29 Jan 17	Wadia Collage M.Sc. Project
NSV 15688	Suspected variable star	31 Jan 17	
TV Lyn	Variable star	11 Feb 17	Annasaheb Magar College M.Sc. Project
Artificial satellites		22 Feb 17	Distance by parallax method; Annasaheb Magar College M.Sc. Project

For these observations, 2185 photographs were clicked in the report year. Main focus of the observations was on variable star

observations. Light curves of selected stars are as follows:





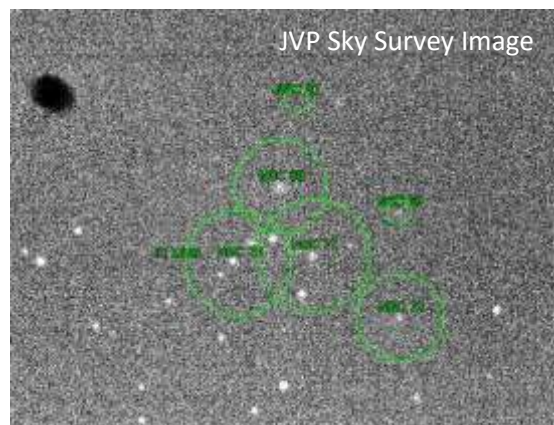
Mr. Aniruddha Deshpande, Vice president of Parisanstha is submitting observations of variable stars conducted through Parisanstha’s observatory to American Association of Variable Star Observers (AAVSO) for last four years.

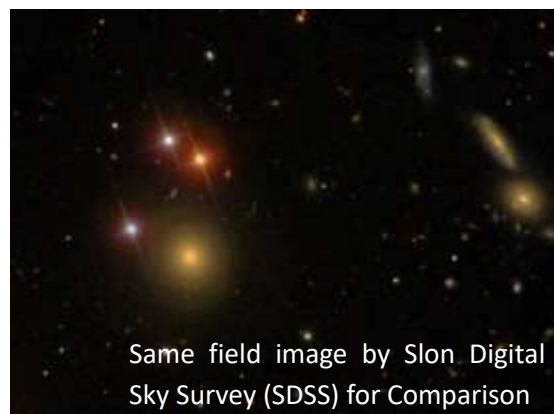
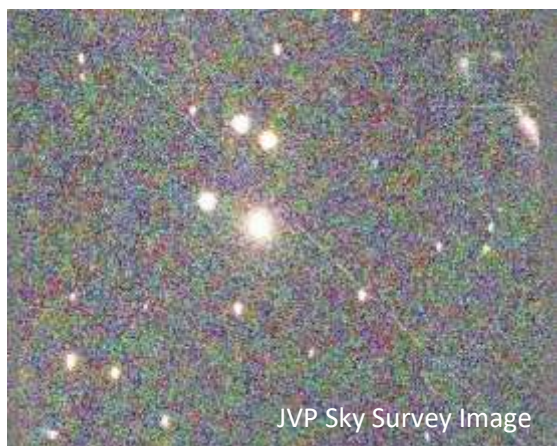
In the report year, Mr. Deshpande became member of AAVSO on behalf of Parisanstha (16 September 2016). Thus observations conducted at Parisanstha’s observatory became open to researchers and educators to all around the globe through AAVSO. The report of usage of the observations carried out by Parisanstha members is as follows:



Month	Variable Star	Number of observations by JVP members	Usage purpose
June 2016	V745 SCO	28	Research
	V339 DEL	21	Research
July 2016	V339 DEL	21	Research
	NOVA DEL 2013	21	Research (2 times)
	W UMA	12	Education
	BP TAU	8	Research
September 2016	U GEM	36	Research
	V339 DEL	21	Research (4 times)
	V339 DEL 2013	21	Research
	NOVA DEL 2013	21	Research
	V0960 MON	11	Observational Analysis
	AB AND	45	Observational Analysis
	SZ LYN	222	Education
	U GEM	36	Research
October 2016	V339 DEL	21	Research (2 times), Education (1 time)
	W UMA	12	Research
November 2016	U GEM	36	Research
	W UMA	12	Research
December 2016	V339 DEL	21	Research (1 time), Miscellaneous (1 time)
	W UMA	12	Education
January 2017	W UMA	12	Research
	V960 MON	11	Research
	V339 DEL	21	Research
February 2017	V339 DEL	21	Research
	EQ TAU	216	Observational Analysis
	2MASS J06593158-0405277	11	Research
March 2017	V339 DEL	21	Research (3 times)
	W UMA	12	Research (2 times)

Parisanstha members conducted sky survey between October 2016 to January 2017. Few selected photographs taken during the sky survey are as follows:





### Msc. Projects

Few students perusing M.Sc. from colleges in Pune city carried out their projects at Kesariwada JVP observatory.

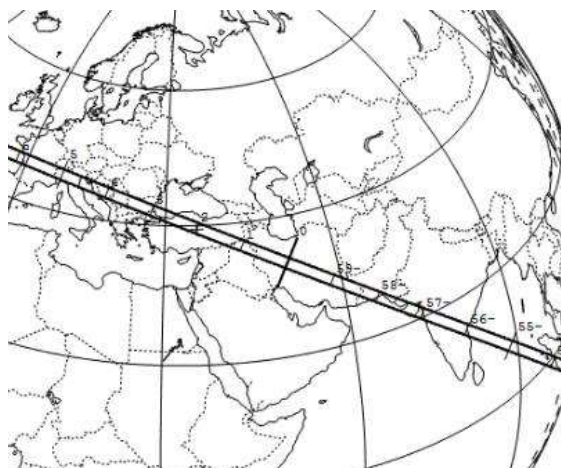
Sr.	Name of Student	College	Project	Guide
1	Mayur Saudagar	Annasaheb Magar College	Variable Star Observation: TV Lynx	Mr. Aniruddha Deshpande
2	Radha Kudmal	H. V. Desai College	Variable Star Observation: V1370 Taurus	Mr. Aniruddha Deshpande
3	Amit Kumar	Nowrosjee Wadia College	Variable Star Observation: RR Gemini	Mr. Aniruddha Deshpande
4	Rucha Sapkal	Nowrosjee Wadia College	Variable Star Observation: SZ Lynx	Mr. Aniruddha Deshpande
5	Sunita Khilari	Nowrosjee Wadia College	Calculating height of artificial satellite using parallax method	Mr. Deepak Joshee
6	Monika Salunkhe	Annasaheb Magar College	Calculating height of artificial satellite using parallax method	Mr. Deepak Joshee
7	Komal Jadhav	Annasaheb Magar College	Calculating speed of light using Io-Jupiter eclipse	Mr. Deepak Joshee

### Asteroid Occultation Observation

On 24 December 2016, the 9 magnitude star: TYC 2430-01124-1 was occulted because of the 10 magnitude asteroid: 22 Calliope for few seconds. This asteroid has average diameter of 166 km. Its shape is not exactly spherical, but uneven ellipsoidal. It is made up of iron and nickel silicates and it was discovered by an astronomer, J. R. Hyde.

On 24<sup>th</sup> December the asteroid travelled in front of star, TYC 2430-01124-1 when its shadow travelled over surface of earth and if one observes the star from same belt of shadow, the star appeared to be dimmed or disappeared for few seconds. In India, this belt was from Bhuj in Gujrat to Nellore in Andhra Pradesh. The cities close to the belt in Maharashtra were: Nasik, Thane, Pune,

Ahmadnagar, Solapur, Latur, Beed. Surat and Wapi from Gujrat were also on the belt.



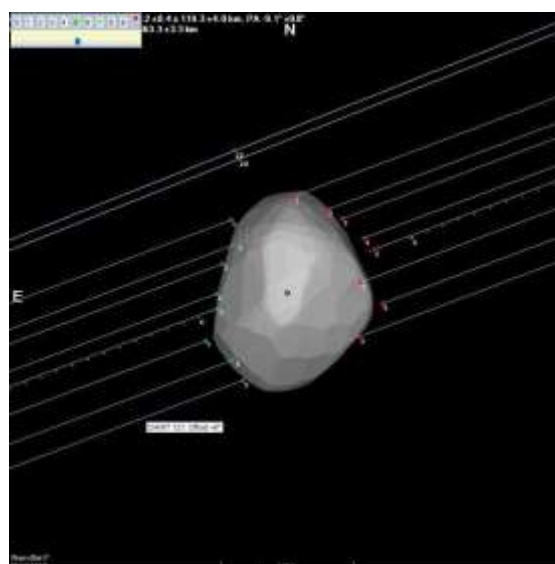
The star as well as asteroid both are faint. Hence locating them in telescope at particular time and video record it was a challenging task. Maximum time of occultation was predicted to be 13.5 seconds.

Members of Parisanstha conducted scientific observations of this occultation under leadership of Mr. Suhas Gurjar, former President, JVP and under guidance of Dr. Paul D. Maley, former Vice-president, International Occultation Timing Association (IOTA) and presently working for NASA’s John Space Center Astronomical Society. The asteroid occultation observation is so important that Dr. Paul Maley who is leading observer in this area specially travelled from USA to Pune to

carry out these observations and conducted so with help of Jyotirvidya Parisanstha.

If we can observe the occultation simultaneously from different locations, then we can determine shape and size of the asteroid.

35 members of Parisanstha formed 16 teams for this observation expedition. One more thing to note is three amateur astronomical associations in Pune participated in this expedition under leadership of JVP.



Out of 19 observing stations, eight stations recorded disappearance and reappearance of the star. Following were the observation stations for this expedition:

No	Place	Longitude (E)	Latitude (N)	Telescope	Observers
1	Sanaswadi Unique Petrol Pump	74.0697425	18.64896	5 inch Cassegrain	Atharva Pathak, Amit Kadlaskar
2	Suraj Petrol Pump	74.18606	18.71956	Paul's Set up	Dinesh Khairnar, Vishwajeet Anjali
3	Ranjangaon	74.25295	18.75934	6 inch Cassegrain	Siddharth Birmal, Prathamesh Kale
4	Siddhant Petrol Pump	74.34220858	18.80848542	Paul's Set up	Vivek Shende, Sayali
5	Durga Lawns	74.41689	18.87392	Paul's Set up	Pooja Naniwadekar, Nisarg Ingole

6	Samarth Multiservices	74.48802	18.93001	6 inch refractor	Shubham Kulkarni
7	Smilestone	74.57558	18.98523	Paul's Set up	Paul Maley, Suhas Gurjar
8	Occultation centre line	74.61092049	19.015221	8 inch reflector	Harshad Abhyankar, Rishikesh Kulkarni
9	Simaratmal Kundanmal Petrol Pump	74.66099	19.03987	10 inch reflector	Ranchandra Karanje, Mayuresh Wagh
10	Ahmednagar	74.741238	19.090309	Paul's Set up	Shruti Deshpande, Harsha Kulkarni
11	Effort Planetarium	74.77026072	19.1869516	4 inch and 8 inch reflectors	Madhavi Patankar, Ketaki Dave
12	Baba Petrol Pump	74.83017	19.2482	Paul's Set up	Mohan Tembe, Monika Gundecha
13	D S Petrol Pump	74.86947	19.332966	Paul's Set up	Siddharth Kamat, Madhuri, Prabhanjan Bongarde
14	Hotel Arya	74.661	19.0396	8 inch reflector	Ranchandra Karanje, Mayuresh Wagh
15	Essar Renuka Petrol Pump	74.94104	19.49494	Paul's Set up + 5 inch reflector	Harshada Kavi, Shruti Deshpande, Aniruddha Deshpande
16	Manjari Hadapsar			8 inch reflector	Umesh Ghule
17	Kesariwada	73.84909543	18.51613532	11 inch cassegrain	Milind Joshi
18	IUCAA	73.82606238	18.55902915		Sonal, Abhay Dasharath
19	Navsari	72.97669899	20.95081804		Avik Dasgupta



### [Astrophotography](#)

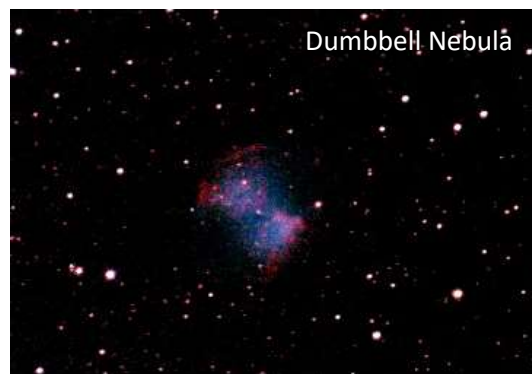
In the report year, Mr. Shubham Kulkarni, Mr. Atharva Pathak, Mr. Siddharth Birmal and Mr.

Vishwajeet Anjali carried out planetary photography from Parisanstha's observatory at Kesariwada. Mr. Shubham Kulkarni processed the images in computer software.

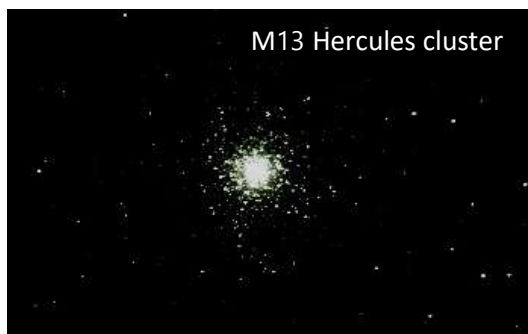


On 23-24 February 2017, following members of Parisanstha carried out astrophotography and astronomical observations from Abhyankar Farms: Mr. Aniruddha Deshpande, Mr. Deepak Joshee, Mr. Mayuresh Wagh, Mr. Omkar Gawali, Mr. Ramchandra Karanje, Mr. Shubham Kulkarni, Mr. Vishwajeet Anjali, Mr. Prabhanjan Bongarde, Mr. MANDar Narawane, Mr. Siddharth Kamat, Ms. Pooja Naniwadekar.

Celestron C5 Maksutov Cassegrain telescope along with Canon 60D camera was used during this session. Following photographs were taken during this session:







M13 Hercules cluster



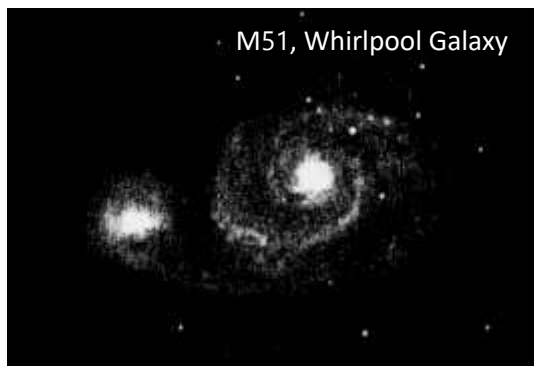
M106



Trifid Nebula



Eagle Nebula



M51, Whirlpool Galaxy

### Other activities

- Mr. Hari Shankar, member, JVP worked with amateur astronomers from Chennai and discovered two main belt asteroids. We congratulate Mr. Hari Shankar for this discovery.
- Mr. Nilay Mokashi, member, JVP is pursuing his post graduate studies at Rochester Institute of Technology, USA. He developed a CCD camera for astronomical observations at the institute. JVP members could successfully record few observations using this CCD at Kesariwada JVP Observatory. We congratulate Mr. Nilay Mokashi for his work.

### Special thanks

Governing council takes this opportunity to thank following members and personalities:

- Firstly, we thank all the enthusiastic members of Parisanstha who made all programs a great success.
- Mr. Shailesh Tilak permitted to set up observatory facility at Kesariwada and made available the terrace of Kesariwada new building free of charge. Additionally, Kesariwada terrace, Tilak Smarak Mandir premises were made available free of charge for open programs. We are thankful to him for this valuable help.
- We are thankful to Tilak Smarak Trust for making place available for office of Parisanstha at Tilak Smarak Mandir as well

- as basement hall at Tilak Smarak Mandir for lectures.
- We are thankful to Dr. Uma Joshi and Dr. Ajit Joshi to make available Dhanvantari Hall for lectures at no cost.
  - Ms. Aparna Kinkar and Mr. Aniruddha Deshpande looked after office activities and financial activities very well throughout the year. We are thankful to both of them.
  - All the public star parties as well as invited star parties of Parisansta were well managed by Mr. Sarang Vandana. He was also helpful in the open programs of Parisansta. We are thankful to him.
  - Mr. Amit Kadlaskar organized all study tours single handedly. We are thankful to him as well.
  - Dr. Amod Rairikar, Mr. Omkar Gawali & Mr. Atharva Pathak, Mr. Mayuresh Wagh and Mr. Ramchandra Karanje helped a lot for telescope maintenance over the year.
  - Mr. Milind Kelkar help a lot to build 3D holo Sun for Aditya exhibition. We are thankful to him.
  - Mr. Deepak Joshee made available his Canon 7D and Canon 5D cameras for observatory setup. We are thankful to Mr. Deepak Joshee.
  - We are thankful to Mr. Divya Oberoi and Mr. Sudhakar Bugdane for their guidance to study tours.
  - We are thankful to Mr. Madhav Gokhale of Daily Sakal, Ms. Swati Shinde – Gole of Times of India and Mr. Ashwin Khan of Pune Mirror for giving publicity of Parisansta's programs in respective newspapers.

\*\* \*\* \*

Appendix 1: Feedbacks

**Pushp Raj**  
March 5 at 8:01am

Had an amazing Overnight star party. big thanks for JVP team for organising such an awesome event! Thanks to Parimal Dave for giving me info about this event. Sarang Vandana explained everything so well, also the volunteers did a great job!! Looking forward to be part of such events in future!!



**Kunal Verma**  
December 4, 2016

As a kid I would sleep while watching the night sky from the window atop my bed. I would use my childlike imaginations to draw different shapes and knit playful stories around the celestial objects. Like the moon's trying to impress the stars with its sharp edges and dapper look. And then days later it's showing off its new look as it illuminated at its peak. I would wander into dreamland playing all sorts of imaginary games with the moon, stars, clusters and all that I could see with the naked eyes.

But yesterday I relived the same old days with a better telescopic view, friends and more interesting stories. Last night I laid awake under the clearly visible night sky to witness a party of its kind.

It's what they call a "Star Party" 🌟🌟🌟

This post is dedicated to Jyotirvidya Parisanstha and Sarang Vandana for being the perfect hosts for a star party yesterday.

Yesterday at the star party the night sky appeared to be at its playful best. The insightful session by Sarang and his well read team enlightened my knowledge on galaxies, planets, nebulae, clusters, satellites, meteoroids, asteroids, scientific achievements in space technology, feats of famous astronauts, success stories of various space expeditions and many more.

The best things off course were the dying stars who would leave an illuminating trail to jazz up the night sky and be kind enough to grant me a wish.

The star party organised by JVP, a complete night filled with knowledge and activities related to telescopic viewing of Venus, Moon, Jupiter, clusters, satellites and many more.

**Pushkar Brahme** added 2 new photos — with Jyotirvidya Parisanstha and 4 others  
November 28, 2016

Hello,

This post is dedicated to Jyotirvidya Parisanstha and Sarang Vandana for enlightening our knowledge on galaxies & planets, nebulae, clusters, satellites.

We had gone to a star party organized by JVP which is a complete night filled with knowledge and activities related to telescopic viewing of Venus, Mars, Moon, Jupiter. Also, Sarang conducts and takes the night going with his acute knowledge on this subject by showing Sky show in detail. He also conducts AstroAntakshari, quiz for making the mood filled with excitement. JVP organizes such star gazing parties till May, so please plan such a party once and enjoy the Universe with your own eyes.

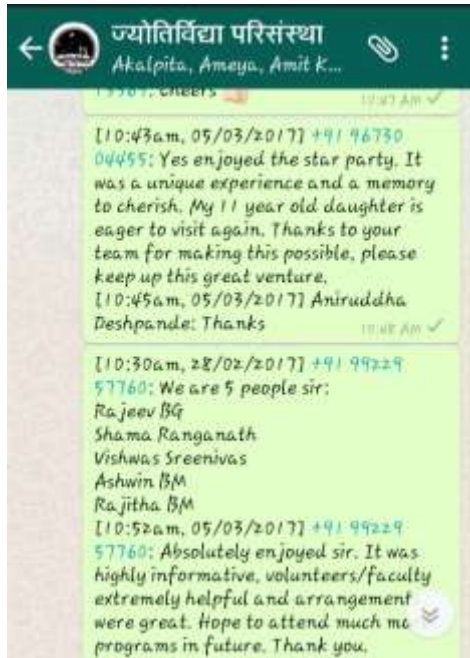
Hats off to JVPs contribution towards this subject and Sarang and all volunteers dedication and in depth study.

**Sangeeta Deshpande**  
December 4, 2016

The star party on 3rd November a memorable event. Kudos to Sarang and team of enthusiastic members and volunteers! Learnt a whole lot about our sky. Thank you for imparting so much vital knowledge without holding back any should I say God bless or Better still STAR BLESS!







## Appendix 2: News Presence

# Global glow for astronomy clubs

SwatiShindeGole  
@timesgroup.com

**Pune:** Amateur astronomy clubs in the city have been able to define the size and shape of an asteroid called 22 Kalliope and their observations have been recognised by the International Occultation Timing Association (IOTA).

On December 24, the asteroid travelled in front of a star identified as TYC 2430-01124-1 and the shadow of this asteroid was cast on earth. The shadow belt of the asteroid spread between Bhuj in Saurashtra to Nellore in Andhra Pradesh. To measure a planetary object, astronomers need to study its occultation.

According to the IOTA, an occultation occurs when a solar-system body passes in front of a more distant object, partially or totally hiding the more distant object, momentarily blocking its light.

Director of Nehru Planetarium Arvind Paranjpye said, "There is a simple way to make these observations. Sometimes these asteroids come directly between a distant star and the earth, just like a solar eclipse. The event can be seen over a narrow shadow path on the surface of the earth, this is

## WHAT HAPPENED ON DECEMBER 24

A remote star, identified by number TYC 2430-01124-1, got occulted by a small asteroid called 22 Kalliope. One revolution around the sun takes it 4.97 earth years and it rotates around itself in 4 hours 8 minutes (Earth time). This asteroid travelled in front of the star on December 24, 2016, 3.26 am. The shadow of the asteroid was cast on certain places. Since the asteroid was travelling in space, its shadow was moving on the



Each line on the sides of the asteroid shows the occultation

surface of the earth. Any one standing in the shadow belt of the star light would notice the star disappearing for a few seconds. This eclipse is called an occultation

occultation. When the asteroid comes between the earth and the star the star just blinks off for a few seconds. By carefully noting the duration over which the star disappeared and reappeared from different locations on the shadow belt, it is possible to determine the size and shape of the asteroid."

Amateur astronomy clubs in Pune set up observation stations at various locations on the Bhuj-Nellore belt and, by measuring the time of occultation accurately, they were able to infer the size – about 166km in diameter – and the asteroid's shape.

mera viewing to observe this event from different locations.

There were various teams, including Citizen's Science Centre, JVP and Akashmitra and from Pune and Nehru Planetarium from Mumbai.

Paul Maley, leading asteroid occultation observer from United States of America and ex-vice president of IOTA was also in Pune for the event. "Paul provided technical support. He brought eight video recording equipment sets and pointed accurately at a field where the star being occulted was to arrive at the time of the occultation. Based on all the observations, Paul and his team analysed and deduced the shape of the asteroid 22 Kalliope," said Deepak Joshi of JVP.

Joshi further explained why such observations are important, "Though asteroids mainly far away in the asteroid belt between Mars and Jupiter, they can sometimes wander and change their path under influence of Jupiter's gravity. Many asteroids come very close to Earth when their orbits are changed due to the pull of Jupiter's gravity. These near earth orbit can be a hazard to life here. Thus, understanding their size and orbit is very important."

Suhas Gurjar, of Jyotirvidya Parisanstha (JVP) and one of the participants of the December 24, 2016 observation said, "There are a lot of lone observers, who note such events. Their work is very important as lone observation gives us an idea of minimum possible dimension of the asteroid. But simultaneous observation from a number of locations, gives one a better idea of the shape and size of an asteroid."

The JVP erected eight video stations between Pune and Aurangabad, three stations for telescope viewing and from one station through DSLR ca-

# PuneMirror

MUMBAI MIRROR | BANGALORE MIRROR | AHMEDABAD MIRROR

## COUNTING LOST STARS

By Ashwin Khan, Pune Mirror | Jun 26, 2016, 02:30 AM IST



Aniruddha Deshpande attaches a Canon 7D DSLR to the telescope at JVP's Kesariwada Jyotirvidya Observatory (as seen in picture) for imaging the night sky. PIC: MAHENDRA KOLHE

***A city-based entrepreneur is putting Pune on the global amateur astronomy map with his work***

On cold winter nights when the Great Bear is distinctly visible in the backdrop of Pune's clear skies, Aniruddha Deshpande, a 52-year-old amateur astronomer has his eyes trained on the twinkling stars. But far from being lost in the beauty of the celestial bodies, he measures their brightness for the benefit of astronomy, for which he was awarded a certificate of appreciation by the American Association of Variable Star Observers (AAVSO) two months ago.

The recognition came as a pleasant surprise since AAVSO, founded in 1911, is one of the biggest and most renowned organisations of its kind in the world. Since its founding, AAVSO was headquartered at places like the Harvard College Observatory, before acquiring their first building in Cambridge, Massachusetts, in 1985. "I didn't know AAVSO awarded certificates," smiled Deshpande, who's been faithfully sharing his data on variable stars (a star whose apparent brightness as seen from Earth changes over time) with AAVSO for the past four years. Given that there are billions of stars out there, compared to which the number of amateur astronomers doing any serious work like Deshpande is scant, his data is invaluable to astronomers around the world.

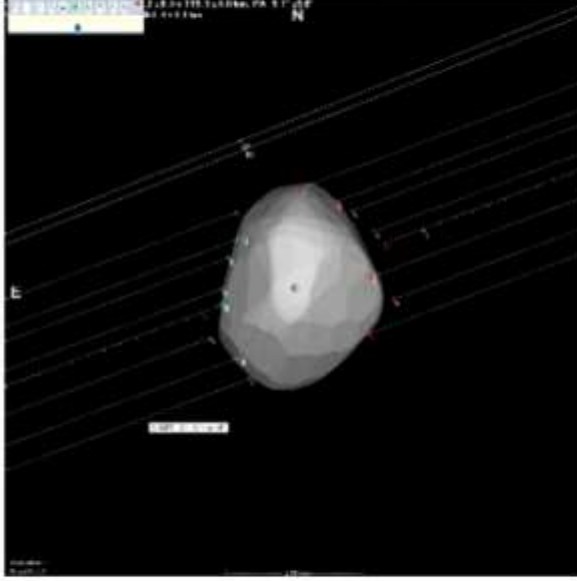
The study of variable stars involves recording their changing brightness. Over 150,000 of them are catalogued, and many thousands more are suspected to be variable. To measure the stars' luminosity, Deshpande uses a DSLR camera attached to the prime focus of a telescope for imaging the sky. He has collected data on around 28 variable stars and has made over 1,800 observations.

Validating Deshpande's study, Samir Dhurde, scientific officer at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), said: "Deshpande is a serious student of astronomy. He has done a commendable job of collecting data on variable stars — this information, which is now available in AAVSO's vast database, can be accessed by astronomers for exploring the universe," adding: "Only 5,000 stars are visible to the naked eye while you can spot lakhs using a telescope. Some stars vary in brightness for various reasons, a phenomenon that's alluring to astronomers. But given there are billions of stars, it's not possible for us to study all of them — this is the reason why a serious amateur astronomer's work is highly appreciated."

## महाराष्ट्र टाइम्स

### लघुग्रहाचा निरीक्षणांनी आकार निश्चित

Maharashtra Times | Jan 8, 2017, 03:51 AM IST



म. टा. प्रतिनिधी, पुणे

लाखो किलोमीटर दूर असणाऱ्या एका लघुग्रहाचा प्रत्यक्ष निरीक्षणांनी आकार निश्चित करण्याचा अभिनव प्रयोग पुण्यातील आकाश निरीक्षकांनी नुकताच यशस्वी केला. २५ डिसेंबरच्या पहाटे २२ कॅलिओप नावाच्या लघुग्रहाने सारथी तारकासमूहामधील एका फिकट ताऱ्याला काही सेकंदांसाठी झाकले. 'इंटरनॅशनल ऑकलटेशन टायमिंग असोसिएशन'च्या (आयोटा) मार्गदर्शनाखाली पुण्यातील ज्योतिर्विद्या परिसंस्था, आकाशमित्र आणि 'सेंटर फॉर सिटीझन सायन्स'च्या (सीसीएस) निरीक्षकांनी या ग्रहणाचे (पिधानाचे) निरीक्षण नोंदवून लघुग्रहाचा आकार निश्चित करण्यात महत्त्वाची भूमिका बजावली.

सूर्यापासून ४३.५ कोटी किलोमीटर अंतरावरून लघुग्रहांच्या पट्ट्यातून फिरणारा २२ कॅलिओप १६७ किलोमीटर लांबीचा असून त्याला लायनस नावाचा एक चंद्रही आहे. जमिनीवरील सर्वात मोठ्या टेलिस्कोपमधून पाहिल्यास हा लघुग्रह एखाद्या ताऱ्यासारखा प्रकाशमान बिंदू दिसतो. अशा लघुग्रहांचा आकार निश्चित करण्यासाठी त्यांच्याद्वारे होणाऱ्या ताऱ्यांच्या ग्रहणाचा (पिधान) आधार घ्यावा लागतो. २५ डिसेंबर २०१६च्या पहाटे सारथी तारकासमूहातील टीवायसी २४३०-०११२४-१ या ९.२ मॅग्निट्यूडच्या ताऱ्याला २२

कॅलिओप या लघुग्रहाने काही सेकंदांसाठी झाकले. या वेळी लघुग्रहाची सावली आंध्र प्रदेश, महाराष्ट्र, गुजरात मार्गाने पुढे युरोपपर्यंत सरकली.

लघुग्रहाच्या सावलीच्या पट्ट्यात जाऊन पुण्यातील आकाश निरीक्षकांच्या गटांनी या अत्यंत फिकट ग्रहणाचा कालावधी नोंदवला. 'आयोटा'चे तज्ज्ञ डॉ. पॉल मॅले यांच्या नेतृत्वाखाली ज्योतिर्विद्या परिसंस्थेच्या निरीक्षकांनी पुणे ते औरंगाबाददरम्यान आठ ठिकाणांहून व्हिडिओच्या साह्याने, तर तीन ठिकाणांहून प्रत्यक्ष दुर्बिणीच्या साह्याने पिधानाचे निरीक्षण नोंदवले. 'सीसीएस'च्या गटांनी पुणे ते नाशिकदरम्यान तीन ठिकाणांहून प्रत्यक्ष दुर्बिणीच्या साह्याने, तर एका ठिकाणाहून डीएसएलआर कॅमेराच्या साह्याने पिधानाचा कालावधी नोंदविला. 'आकाशमित्र'च्या एका गटाने सावलीच्या पट्ट्याच्या मध्यरेषेवरून या घटनेचे निरीक्षण केले.

लघुग्रहाच्या सावलीच्या पट्ट्यातून पुण्यातील निरीक्षकांनी नोंदवलेला पिधानाचा कालावधी सर्व ठिकाणी वेगळा होता. या वेगवेगळ्या कालावधीवरूनच लघुग्रहाच्या सावलीचा आणि लघुग्रहाचा आकार निश्चित करणे शक्य झाले, असे डॉ. पॉल यांनी सांगितले.

'हौशी निरीक्षकांना खगोल संशोधनात संधी'

हौशी आकाशनिरीक्षण महत्त्वावर अंधाऱ्या रात्री शहरापासून दूर दुर्बिणीतून ग्रह, तारकापुंज, नेब्युला पाहणे, छायाचित्रण करणे, असे चित्र डोळ्यासमोर उभे राहते. मात्र, हौशी आकाशनिरीक्षक प्रत्यक्ष वैज्ञानिक प्रयोगांमध्ये सहभागी होऊन खगोल संशोधनात महत्त्वाची भूमिका बजावू शकतात, याचे उदाहरण या पिधानाच्या निरीक्षणाने घालून दिल्याची प्रतिक्रिया नेहरू तारांगणाचे संचालक अरविंद परांजपे यांनी दिली. राज्यातील हौशी आकाशनिरीक्षण संस्थांच्या समन्वयातून येत्या काळात अशाच प्रकारचे वैज्ञानिक प्रयोग राबवण्यासाठी आयुका आणि नेहरू तारांगणातर्फे पुढाकार घेण्यात येणार असल्याचे त्यांनी सांगितले.