

GUEST LECTURE



The IAPT SRC-08E and Physics Society of Shri Shivaji Science College, Nagpur is pleased to announce Guest Lecture scheduled as following.

■ SEEING THE INVISIBLE: STRONG GRAVITATIONAL LENSING BY BLACK HOLES

■ SPEAKER: Dr Sushant Ghosh,
Professor Centre for Theoretical Physics,
Jamia Millia Islamia, New Delhi

■ Date: Friday 12th December 2025 at 3pm
Venue: C4, Block C, 3rd Floor, Shivaji Science College,
Congress Nagar, NAGPUR

■ ZOOM Meeting ID: 817 7081 5135

Passcode: 171414

Online link:

<https://us06web.zoom.us/j/81770815135?pwd=syLVFKvyNyHlbOuspIsCfgrRDynDYvL1>



Shri Shivaji Education Society Amravati's

Science College Congress Nagar, Nagpur

Report

Guest Lecture on “Seeing the Invisible: Strong Gravitational Lensing by Black Holes”

Session 2025-2026

Organised by: In association with Indian Association of Physics Teachers (IAPT) Sub-Regional Council 08E (Vidarbha) and Physics Society, Department of Physics, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur.

Date: 12 December 2025

Time: 3.00 pm to 4.30 pm

Venue: Department of Physics, C4 Hall

Place: Nagpur

Introduction

The Department of Physics, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur, in association with the Indian Association of Physics Teachers (IAPT), Sub-Regional Council 08E (Vidarbha) and the Physics Society (2025–26), successfully organized a guest lecture on “*Seeing the Invisible: Strong Gravitational Lensing by Black Holes*” on Friday, 12 December 2025, at 3.00 pm in the C4 Hall of the Department of Physics.

The programme aimed to expose undergraduate and postgraduate students, research scholars, and faculty members to contemporary developments in astrophysics and black hole physics, particularly the fascinating phenomenon of gravitational lensing. The programme was conducted in a **hybrid mode**, with physical participation at Shri Shivaji Science College and virtual attendance through the Zoom platform. Additionally, the lecture was live-streamed and the **YouTube video link of the session is available** for wider access.

Programme Schedule and Proceedings

The programme commenced at **3.00 pm** with a warm welcome of the guest and dignitaries by words delivered by the Master of Ceremony, **Dr. G. L. Jadhav** (Treasurer, IAPT SRC-08E). This was followed by a **tribute and garlanding of portraits** as a mark of respect to the great contributors to science and education.

At **3.05 pm**, the dignitaries were formally welcomed.

- **President of the Programme:** Hon'ble **Dr. O. S. Deshmukh**, Principal, Science College, Congress Nagar, Nagpur
- **Guest Speaker:** **Dr. Sushant Ghosh**, Professor and Director, Centre for Theoretical Physics (CTP), Jamia Millia Islamia, New Delhi

The welcome of the President and the Guest Speaker was carried out by **Prof. S. W. Anwane**, Head, Department of Physics, along with **Mr. B. T. Kumbhare**, Convener, Physics Society.

Introductory Speech

Prof. S. W. Anwane, Head of the Department of Physics and President, Indian Association of Physics Teachers, Sub-Regional Council 08E (Vidarbha), delivered the introductory speech. He expressed that he felt deeply privileged and proud to recall his association with the retired eminent professors of the department. He highlighted their lifelong dedication, outstanding contributions to the subject of Physics, and their selfless service in building the strong academic foundation of the department. He emphasized that the presence of these eminent former professors during the guest lecture was truly inspiring for students and faculty alike and reflected their enduring passion for physics and commitment to academic excellence.

Introduction of the Guest Speaker: Mr. Ashish Deulkar, student of BSc first year introduced the guest speaker, Dr. Sushant Ghosh. He presented a brief yet informative profile, highlighting Dr. Ghosh's illustrious academic career of over 30 years.

Guest Lecture

The guest lecture by **Dr. Sushant Ghosh** began, followed by an interactive question-and-answer session.

Speaking on the topic "*Seeing the Invisible: Strong Gravitational Lensing by Black Holes*", Dr. Ghosh began by drawing an analogy with familiar optical lenses such as concave and convex lenses, explaining how lenses bend light rays to produce magnified or reshaped images. He then posed a fundamental question: if light naturally travels along a straight path known as a geodesic (the shortest path), how can it bend without an optical lens?

He explained that instead of bending light directly, one can bend **space-time itself**, and this curvature of space-time results in the bending of light. This phenomenon is described by **Einstein's theory of General Relativity**, where massive objects like black holes curve the surrounding space-time. As a result, light passing near a black hole follows a curved trajectory, producing a gravitational lensing effect.

Dr. Ghosh elaborated gravitational lensing is a phenomenon in which light from a distant object bends while passing near a massive body such as a galaxy or a black hole due to the curvature of space-time predicted by Einstein's General Theory of Relativity. This bending of light can produce multiple images, magnification, or distortion of the background object. Gravitational lensing is classified into weak, strong, and microlensing depending on the mass of the lens and

the degree of distortion observed. Research in gravitational lensing provides a powerful tool to study otherwise invisible objects, including black holes and dark matter. It also helps astronomers probe the large-scale structure of the universe and test fundamental theories of gravity. Ongoing research combines theoretical modelling, numerical simulations, and high-precision astronomical observations to deepen our understanding of cosmic phenomena. The lecture was rich in theoretical insights and presented in a manner accessible to students, making complex concepts of black hole physics both engaging and comprehensible.

Presence of Eminent Professors

The programme was further enriched by the gracious presence of several retired and serving eminent professors of the Department of Physics, including **Prof. M. T. Dharmadhikari (Ex. Professor)**, **Prof. D K Burghate (Ex. Principal)**, **Prof. S B Kondawar (Ex. Pro VC, RTMNU Nagpur)**, **Prof. Khobragade (Ex. Director Govt. Institute of Science, Nagpur)**, **Prof. S B Khasare**, **Prof. D W Khade**, **Prof Govind Lakhotiya**, **Prof. Dongare**, **Prof. M.R. Lanjewar Madam**, and **Prof. K.N. Pawar Madam**. Their presence reflected their enduring attachment to the department and their continued interest in academic activities.

The efforts taken for the success of the guest lecture by the faculty members of the department of physics Dr. Ragini Pathare, Dr. Sugandha Khangar, Dr. Shahin Sayyad, Mr. Parag Bramhanakar, Miss. Kanchan Jivnapurkar, Mr. Bhashit Shinde, Miss. Devyaani Nage along with the non-teaching staff.

Presidential Address

The Presidential Address was delivered by **Hon'ble Dr. O. S. Deshmukh**, Principal of the college. He highlighted the rich legacy and heritage of Shivaji Science College and its consistent excellence in both academic and non-academic activities. He emphasized that the presence of eminent retired professors clearly demonstrated their love for the subject of Physics and their deep-rooted association with the department. He appreciated the efforts of the Department of Physics and IAPT SRC 08E in organizing such intellectually stimulating programmes.

Concluding remarks by Prof P K Ahluwalia

Prof. P. K. Ahluwalia, President of Central IAPT and former Professor at Himachal Pradesh University, summed up the lecture and warmly appreciated the speaker for his lucid and witty explanation of gravitational lensing, as well as the focused and impactful research work carried out by Dr. Ghosh. He remarked that it was indeed commendable and a matter of pride that certain black hole solutions are known in the scientific community as “**Ghosh black holes**,” named after the speaker himself.

Vote of Thanks

The Vote of Thanks was proposed by **Mr. Bhupendra Kumbhare**, Convener of the Physics Society. He thanked respected Principle **Dr. O. S. Deshmukh**, the guest speaker **Dr. Sushant Ghosh**, and all the retired professors who have built and sustained the strong academic legacy of the Department of Physics. He remarked that the department was truly fortunate to have the presence and guidance of such distinguished personalities.

Conclusion

The programme concluded with refreshments and informal interactions. The guest lecture was highly informative, inspiring, and academically enriching. It provided students and faculty members with valuable insights into modern astrophysics and black hole research. The programme was successfully anchored by **Dr. Gajanan Jadhav**, Treasurer, IAPT SRC-08E (Vidarbha), and was widely appreciated by all participants.

Date: 12/12/2025

Place: Nagpur.



B T Kumbhare



Dr. S. W. Anwane
Professor and Head
Department of Physics
Shri Shivaji Education Society Amravati's
SCIENCE COLLEGE
Congress Nagar, Nagpur.

https://www.youtube.com/live/M6ax_i7bhJo?si=70IoJJSNMiIECBOb

Short Report/News Item

Guest Lecture on “Seeing the Invisible: Strong Gravitational Lensing by Black Holes” Held at Science College, Nagpur

Nagpur, 12 December 2025: The Department of Physics, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur, in association with the Indian Association of Physics Teachers (IAPT), Sub-Regional Council 08E (Vidarbha) and the Physics Society (Session 2025–26), successfully organized a guest lecture on “**Seeing the Invisible: Strong Gravitational Lensing by Black Holes**” on Friday, 12 December 2025. The lecture was conducted from 3.00 pm to 4.30 pm in the **C4 Hall** of the Department of Physics. The programme was conducted in a **hybrid mode**, with physical participation at Shri Shivaji Science College and virtual attendance through the Zoom platform. Additionally, the lecture was live-streamed and the **YouTube video link of the session is available** for wider access.

The programme aimed to acquaint undergraduate and postgraduate students, research scholars, and faculty members with recent advances in astrophysics, particularly the intriguing phenomenon of gravitational lensing associated with black holes.

The guest speaker for the occasion was **Dr. Sushant Ghosh**, Professor and Director, Centre for Theoretical Physics (CTP), Jamia Millia Islamia, New Delhi.

Prof. S. W. Anwane, Head of the Department of Physics and President, IAPT SRC-08E (Vidarbha), expressed his pride in recalling his association with the retired eminent professors of the department. He highlighted their lifelong dedication, significant contributions to physics education, and their role in building a strong academic foundation for the department. The guest speaker, **Dr. Sushant Ghosh**, was introduced by **Mr. Ashish Deulkar**, a student of B.Sc. First Year, who briefly outlined Dr. Ghosh's distinguished academic career spanning more than three decades.

During the lecture, Dr. Ghosh delivered an engaging and insightful talk on **strong gravitational lensing by black holes**. Beginning with familiar concepts of concave and convex lenses, he explained how light bends in the presence of mass. He then addressed the fundamental question of how light, which normally travels along geodesics, can bend without a physical lens. Drawing upon Einstein's theory of General Relativity, he explained that massive objects such as black holes curve space-time itself, causing light to follow curved paths and resulting in gravitational lensing. Dr. Ghosh further elaborated on the theoretical and mathematical framework of the phenomenon, discussing solutions of Einstein's field equations and their role in describing black hole space-times. He explained how these solutions, when used in the Lagrangian formalism, lead to expressions involving kinetic and effective potential energies. He highlighted that unstable photon orbits, corresponding to zero effective potential, give rise to observable lensing effects that allow astronomers to indirectly observe black holes—thus enabling scientists to “see the invisible.” The lecture concluded with an interactive question-and-answer session, which was enthusiastically participated in by students. Prof. P. K. Ahluwalia, President of Central IAPT and former Professor at Himachal Pradesh University, summed up the lecture and warmly appreciated the speaker for his lucid and witty explanation of gravitational lensing, as well as the focused and impactful research work carried out by Dr. Ghosh. He remarked that it was indeed commendable and a matter of pride that certain black

hole solutions are known in the scientific community as “**Ghosh black holes**,” named after the speaker himself.

The programme was enriched by the presence of several retired and serving eminent professors, including **Prof. M. T. Dharmadhikari, Prof. D.K. Burghate, Prof. S.B. Kondawar, Prof. J.M. Khobragade, Prof. D.B. Khasare, Prof. D.W. Khade, Prof. Govind Lakhotiya, Prof. Dongare, Prof. M.R. Langewar, and Prof. K.N. Pawar**, whose presence reflected their enduring association with the department. The successful organization of the event was supported by faculty members **Dr. Ragini Pathare, Dr. Sugandha Khangar, Dr. Shahin Sayyad, Mr. Parag Bramhanakar, Miss Kanchan Jivnapurkar, Mr. Bhashit Shinde, Miss Devyaani Nage**, along with the non-teaching staff.

In his presidential address, **Dr. O. S. Deshmukh** highlighted the rich legacy of Shivaji Science College and appreciated the efforts of the Department of Physics and IAPT SRC-08E in organizing such academically stimulating programmes. The **Vote of Thanks** was proposed by **Mr. Bhupendra Kumbhare**, Convener, Physics Society. The guest lecture was widely appreciated for its academic depth and clarity, leaving a lasting impression on all participants.

Date: 12 December 2025

Place: Nagpur

Very Short Report for Bulletin of IAPT

Guest Lecture on “Seeing the Invisible: Strong Gravitational Lensing by Black Holes” Held at Science College, Nagpur

Nagpur, 12 December 2025: The Department of Physics, Shri Shivaji Education Society Amravati’s Science College, Congress Nagar, Nagpur, in association with IAPT Sub-Regional Council 08E (Vidarbha) and the Physics Society (2025–26), organized a guest lecture on “**Seeing the Invisible: Strong Gravitational Lensing by Black Holes**” on 12 December 2025 in the C4 Hall. The programme was conducted in **hybrid mode**, with both physical participation and virtual attendance via Zoom, and was also made available through a YouTube link.

The lecture was delivered by **Dr. Sushant Ghosh**, Professor and Director, Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi. He explained the concept of gravitational lensing using analogies from optics and Einstein’s General Relativity, highlighting how black holes bend space-time and light, enabling indirect observation of otherwise invisible cosmic objects. The session was informative, interactive, and well received by students and faculty. Prof. P. K. Ahluwalia, President of Central IAPT and former Professor at Himachal Pradesh University, summed up the lecture and warmly appreciated the speaker for his lucid and witty explanation of gravitational lensing, as well as the focused and impactful research work carried out by Dr. Ghosh.

The programme was enriched by the presence of several retired and serving eminent professors, including **Prof. M. T. Dharmadhikari**, **Prof. D.K. Burghate**, **Prof. S.B. Kondawar**, **Prof. J.M. Khobragade**, **Prof. D.B. Khasare**, **Prof. D.W. Khade**, **Prof. Govind Lakhotiya**, **Prof. Dongare**, **Prof. M.R. Langewar**, and **Prof. K.N. Pawar**, whose presence reflected their enduring association with the department. The successful organization of the event was supported by faculty members **Dr. Ragini Pathare**, **Dr. Sugandha Khangar**, **Dr. Shahin Sayyad**, **Mr. Parag Bramhanakar**, **Miss Kanchan Jivnapurkar**, **Mr. Bhashit Shinde**, **Miss Devyaani Nage**, along with the non-teaching staff.

In his presidential address, **Dr. O. S. Deshmukh** highlighted the rich legacy of Shivaji Science College and appreciated the efforts of the Department of Physics and IAPT SRC-08E in organizing such academically stimulating programmes. The **Vote of Thanks** was proposed by **Mr. Bhupendra Kumbhare**, Convener, Physics Society. The guest lecture was widely appreciated for its academic depth and clarity, leaving a lasting impression on all participants.

The programme was graced by eminent professors and concluded with appreciations, a vote of thanks, and enthusiastic feedback from participants.

Date: 12 December 2025

Place: Nagpur

Glimpses of Program



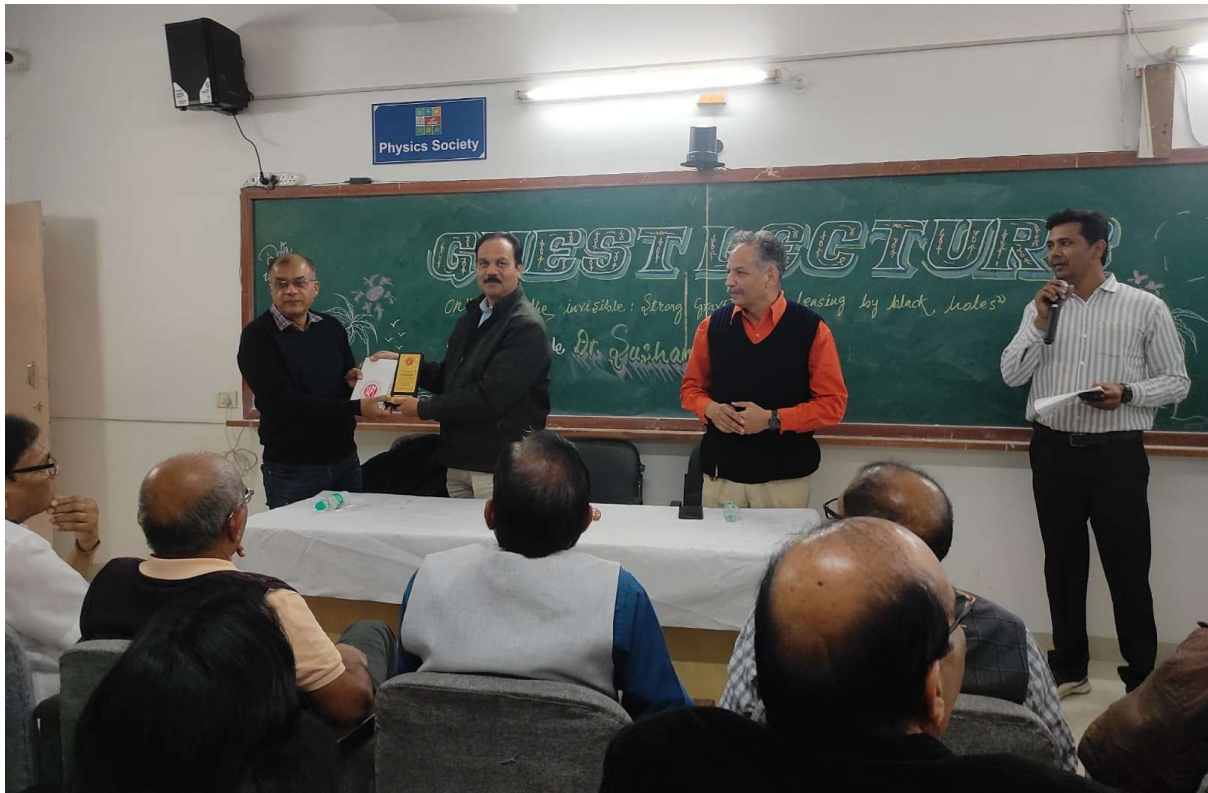














Attendance

Shri Shivaji Education Society Amravati's SCIENCE COLLEGE

Congress Nagar, Nagpur

PHYSICS SOCIETY 2025-26

Guest Lecture on

Seeing the invisible: Strong Gravitational lensing by black holes

Date : 12th December 2025

Time : 3 PM

Sr. No.	Name	Class/Designation	Signature
1	Sushant Ghosh		
2	Dhanraj Khale Extended Phy		
3	Subhash Kondam (Phy)		
4	Kalpna Pawar		
5	Prof. Mamata R. Lanjewar		
6	Jasam Khobrayade		
7	S.B. Khasare		
8	Jr D.K. Burghate		
9	S.W. Ambane		
10	Mr Bhashit Shinde	Asst. professor	
11	Mr Bhupendra T. Kumbhar	Asst. Professor	
12	Mr P.A. Boamhankar		
13	Dr Yogita Meshram	Professor	
14	Dr Reshal Deshmukh	Professor	
15	Dr Ragini Patil	Asst. Prof	
16	Prof. Mamata R. Lanjewar	Professor	
17	Ms. Kanchan Jivnapurkar	Asst. Prof.	
18	Ms. Divyani Nage	Asst. Prof	
19	Ms. Renuka Thewari	Asst. Prof	
20	Apurva D. Fuladi	Asst. Prof	

Shri Shivaji Education Society Amravati's SCIENCE COLLEGE

Congress Nagar, Nagpur

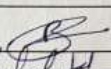
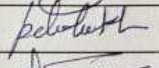
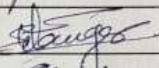
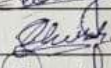
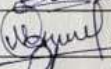
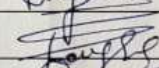
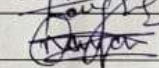
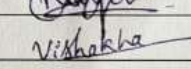
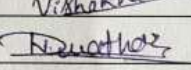
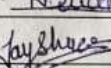
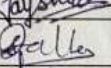
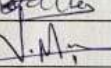
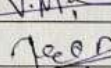
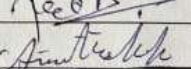
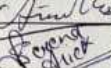
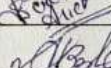
PHYSICS SOCIETY 2025-26

Guest Lecture on

Seeing the invisible: Strong Gravitational lensing by black holes

Date : 12th December 2025

Time : 3PM

Sr. No.	Name	Class	Signature
21	Dr. P. B. Samarkar	Asst. Prof	
22	Dr. P. N. Deshmukh	Asst. Prof	
23	Dr. S. V. Khargare	Asst. Prof	
24	Mr. Tahir Nasser Sheikh	Researcher	
25	Ms. Mrunal V. Janbandhan	Researcher	
26	Ms. Prachi P. Khobragade	Researcher	
27	Prof. Dr. R. S. Dongre chemistry dept	Staff	
28	Mr. Nayan Umare	Student	
29	Vishakha R. Nirane	MSc 1 st year	
30	Divya V. Wathkar	BSc 3 rd yr	
31	Jayshree P. Yadav	MSc 1 st yr	
32	Shubham Zalkar	M.Sc 1 st yr	
33	Vihang Muthram	BSc 1 st yr	
34	Peem Khobragade	BSc 1 st yr	
35	Archhit Wagh	BSc 1 st year	
36	Serena Allick	BSc 1 st year	
37	Anya Borkar	BSc 1 st year	
38	Ashish Desurkar	BSc 1 st year	
39	Dr. Gajanan Jadhav		
40			

Department of Physics

Dear Participant,

Thank you for attending the Guest Lecture on "Seeing the Invisible: Strong Gravitational Lensing by Black Holes".

We hope the session enriched your understanding and sparked curiosity about this fascinating topic.

Kindly take a moment to fill out the feedback form linked below. Your feedback is valuable and helps us improve future events.

 Google Form: <https://forms.gle/8zPW2nKsSKiBUVby9>

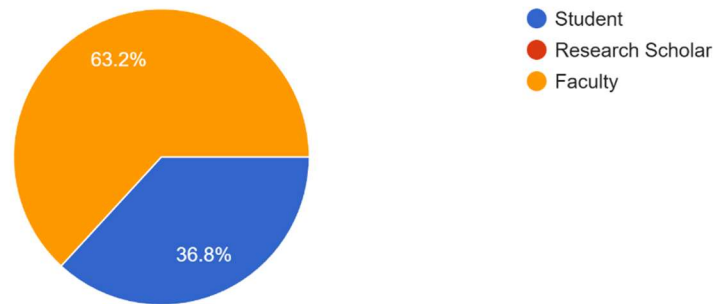


Please note that your Participation Certificate will be generated and sent automatically after you submit the form.

Thank you for your time and cooperation.

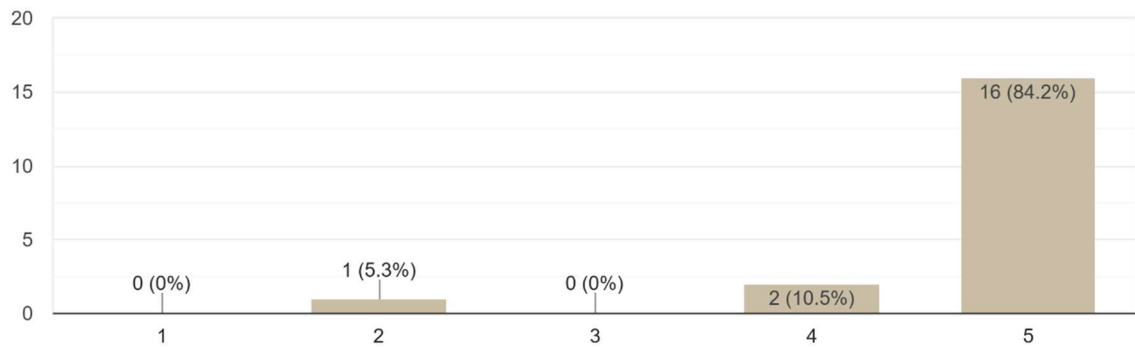
Designation (Student\Research Scholar\Faculty):

19 responses



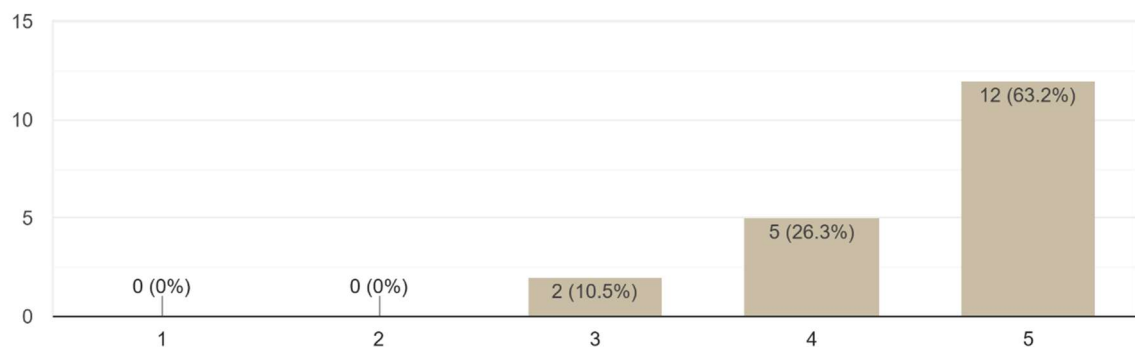
Overall Rating for the Guest Lecture on "Seeing the Invisible: Strong Gravitational Lensing by Black Holes"? (1- POOR , 5- EXCELLENT)

19 responses



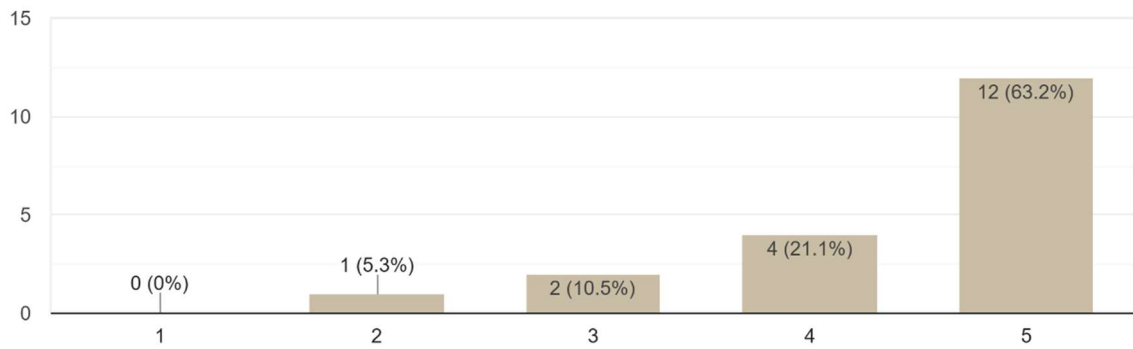
Was the content relevant to your interests?

19 responses



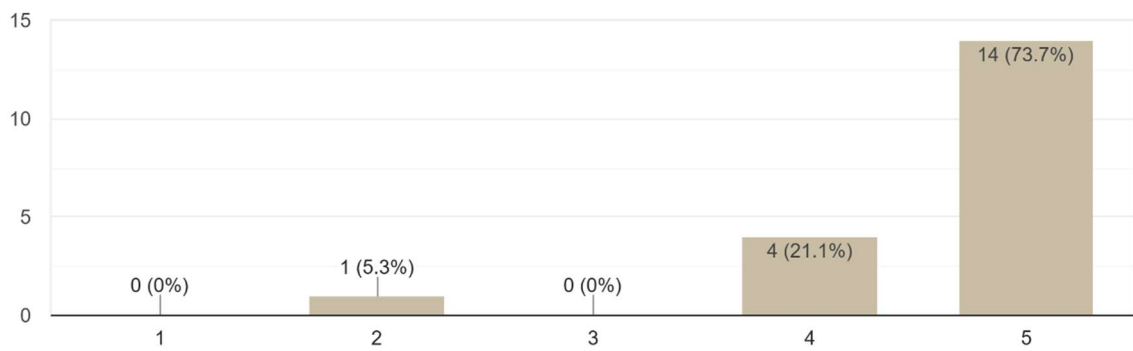
Were the topics covered in-depth and informative? (1- POOR , 5- EXCELLENT)

19 responses



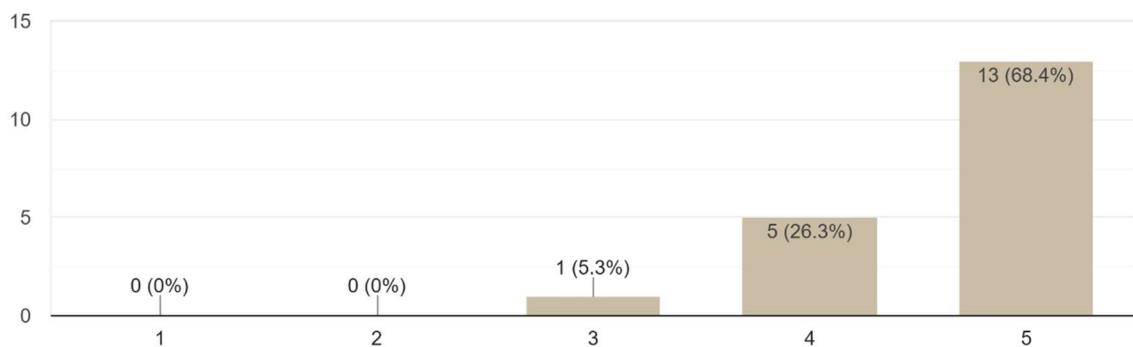
Rate the quality of the speaker. (1- POOR , 5- EXCELLENT)

19 responses



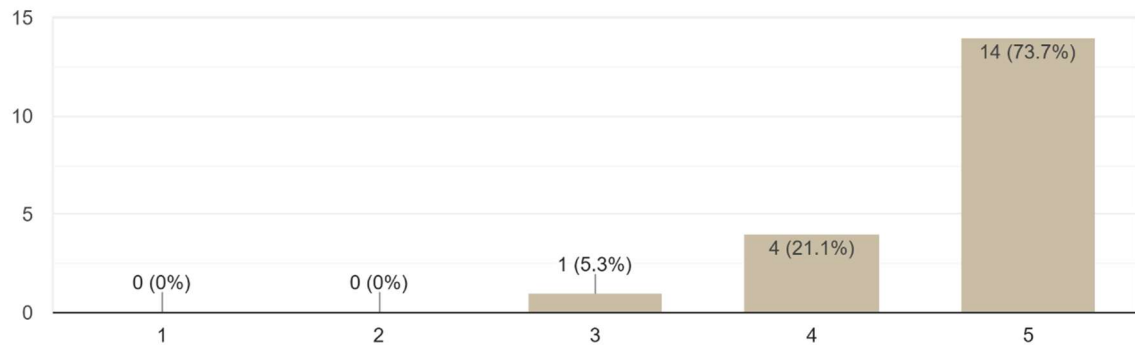
Were the speakers engaging and knowledgeable? (1- POOR , 5- EXCELLENT)

19 responses



How would you rate overall organization of the Guest Lecture organized by IAPT and Department of Physics, Shri Shivaji Education Society Amra...CIENCE COLLEGE, Nagpur? (1- POOR , 5- EXCELLENT)

19 responses



Any suggestion or comment you want to give for improvements of such activity?

- Keep it up
- "It was really informative and inspiring
- Very nice
- Excellent
- Time duration of such lectures could be increased.
- Overall activity is excellent.
- We would like to listen on EPR paradox
- If possible invite noble laureate
- Event Was Very Nice.
- Program time should be little earlier
- Nice activity. Whatever delivered in lecture, was beyond imagination , it was very curious and interesting lecture,... Young people must get exposure of such type of lecture....Very good



**Shri Shivaji Education Society Amravati's
SCIENCE COLLEGE
CONGRESS NAGAR, NAGPUR.
SCIENCE ASSOCIATION
PHYSICS SOCIETY 2025-26**



Dr. O S Deshmukh
Principal

Dr. S W Anwane
Professor & Head

Mr. B T Kumbhare
Convener

9422122711 swanwane2000@yahoo.com 9028195613

Co-conveners

Dr. Mrs R N Pathare
Dr. S. V. Khengar
Dr. (Ms) Shahin K. Sayyad
Mr. P.A. Bramhankar
Dr. Gajanan L. Jadhav
Ms. Kanchan Jivnapurkar
Ms. Devyani Nage
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Date:- 01/12/2025

To,
Dr. Sushant Ghosh,
Professor Centre for Theoretical Physics,
Jamia Millia Islamia, New Delhi 110 025, India
(Astrophysics and Cosmology Research Unit, School of Mathematics, Statistics
and Computer Science, University of KwaZulu-Natal, Private Bag 54001,
Durban 4000, South Africa)

Subject: Invitation for Research Visit and Talk at Science College, Nagpur on
Friday 12th December 2025 at 3pm

Dear Prof Ghosh

I hope you are doing well!

On behalf of the Department of Physics, Science College, Nagpur, it is my great
pleasure to invite you for a research collaboration visit from December 12-16,
2025. We would also be honoured if you could deliver a talk during your visit on
one of your recent research contributions in black hole physics or related areas.

Your pioneering work in black hole physics and gravitational theory has had a
profound impact on our academic community. We believe that your visit will
significantly enhance collaborative research efforts and inspire our students and
colleagues.

Kindly confirm your availability for our internal communications at your
convenience. We will be happy to make all necessary arrangements.

Regards,

Dr. S. W. Anwane
Professor and Head
Department of Physics
Shri Shivaji Education Society Amravati's
SCIENCE COLLEGE
Congress Nagar, Nagpur.



**Shri Shivaji Education Society Amravati's
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12.12.2025

To,

Dr. Sushant Ghosh

Professor, Centre for Theoretical Physics
Jamia Millia Islamia, New Delhi-110025, India
(Astrophysics and Cosmology Research Unit, School of Mathematics, Statistics
and Computer Science,
University of KwaZulu-Natal, Private Bag 54001, Durban 4000, South Africa)

**Subject: Appreciation for Your Talk at Science College, Nagpur on 12
December 2025**

Dear Prof. Ghosh,

On behalf of the IAPT SRC-08E, we express our sincere appreciation for your visit to our institute and for delivering an enlightening lecture entitled "*Seeing the Invisible: Strong Gravitational Lensing by Black Holes*." Your continued contributions to the fields of black hole physics and gravitational theory are highly valued. Your pioneering research has profoundly influenced our academic environment and continues to inspire young researchers.

Your lecture was highly engaging and informative, and it was greatly appreciated by students and faculty alike. We are pleased to inform you that the lecture has been made available on YouTube at the following link:
https://www.youtube.com/live/M6ax_i7bhJo?si=70loJJSNMilECBOb

Thank you once again for your inspiring scholarly work. We look forward to the privilege of hosting you again in the future.

Warm regards,

Dr. S. W. Anwane
Professor and Head
Department of Physics
Shri Shivaji Education Society Amravati's
SCIENCE COLLEGE
Congress Nagar, Nagpur.



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Date: 12/12/2025

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Warm regards,

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President
IAPT SRC-08 E