

UGC Sponsored Conference
on
Einstein's Theories and Present Scenario

17th, 18th and 19th November, 2005, Thane

Editorial Committee

Prof. V. D. Golatkar
Dr. M. N. Nyayate
Prof. N. D. Mandge
Prof. A. A. Kale

Organised by



Department of Physics

Vidya Prasarak Mandal's
B.N. Bandodkar College of Science
"Jnanadweepa", Chendani, Bunder Road,
Thane (W) 400 601. Maharashtra

and



Marathi Vidnyan Parishad, Thane Vibhag

Dr. H.S. Bhanushali Hospital, "Kaushalya",
Shivaji Path, Thane (W) 400 602.

Please Note:

The Authors of the papers are alone responsible for technical content of the papers and references cited therein.

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From the Chairman's Desk

Dear sir/Madam

I have great pleasure in publishing the proceedings of the three-day conference on **Einstein's Theories & Present Scenario**, which was held on 17th, 18th & 19th November in the year 2005 in celebration of the centenary of his theories, which he had proposed in the year 1905.

Many prominent scholars have presented their papers in this volume and I am sure the content of this volume will be a useful additional reading on the subject.

Einstein submitted four papers to a German language journal *Annalen der Physik* in the year 1905. These papers are commonly referred as *Annus Mirabilis Papers*. They form the foundation of the Modern Physics.

His papers on special theory of relativity and on electromagnetic radiation revolutionized our understanding of Universe.

These theories became the basis of quantum theory and theory of atomic phenomena.

In the year 1921 Einstein was awarded the prestigious Noble Prize for his work on photo electricity. Though all four papers published by him in the year 1905 deserved to be mentioned in the citation, only his work on photo electricity is mentioned in the citation.

Einstein's fourth paper published in year 1905 (September 27) in the journal *Annals der Physik* contains the most famous equation $E=mc^2$.

The International Union of Pure and Applied Physics decided to commemorate the 100th year of the publication of Einstein's work in 1905 as the year of Physics which subsequently was endorsed by the United Nations.

Impact of his theories is so immense that its influence goes beyond physics.

His theories have changed our worldview. In his general theory of relativity, which he proposed ten years after his special theory of relativity, gravity was included in the framework. This radically modified our concept of time and space.

Einstein strongly believed in the inherent harmony of the nature. He has given us a new vision.

I am sure seminars like this will help us understand his theories better.

Thanking you

Vijay Bedekar

Chairman,
Vidya Prasarak Mandal, Thane

Foreword

It is a great pleasure to give this souvenir in your hands as the convener of the conference.

This year being the 100th Anniversary of Einstein's research papers it was celebrated as the year of Physics all over the world. We thought of giving our tribute to the eminent scientist by conducting a conference on his own theories & try to bring Einstein in front of the students & common man.

I am really happy for overwhelming response we received. Prof. Jayantrao Naraliker's name, worked as a magnet as Gadkari Rangayatan was housefull for the open lecture & some interested crowd had to go back home as there was no place to seat. Some people later preferred to seat on the stairs & hear Prof. Naraliker. We are thankful to Prof. Naraliker for giving all three days for us.

The star gazing programme with four to five telescopes & about 100 pairs of eyes gazing at the sky was a wonderful experience on the terrace of our college. We are thankful to Mr. D. K. Soman for conducting such an excellent open session.

Similarly, we are also thankful to all the research scientists from TIFR, BARC, University of Mumbai, IUCCA Indian Planetary Society of India who have given their valuable time for conference.

The participation of Marathi Vidnyan Parishad, Thane Vibhag as co-organizers was very fruitful.

We are also thankful to all the supporters who have given their advertisement in our souvenir. Thanks are also due to UGC as they have sent the money very promptly.

I appreciate the full support of our Vidya Prasarak Mandal, my teacher colleagues & non-teaching staff, the students of our college & all participants.

Let us meet on the same platform with some other issues to discuss.

Dr. Madhuri Pejaver

Convener, Principal
B.N. Bandodkar College of Science, Thane

Preface

The fundamental momentous discoveries in physics like X-rays (1895), Radioactivity and Raman effect (1896), Electron (1897) Quantum Theory (1900), explanation of Photoelectric effect and Relativity (1905), 1st trans-Atlantic telegraphic radio transmission and the existence of ionosphere were made in the decade 1895 -1905. The Theory of relativity is a feather in the cap of discoveries made in this decade. Individually, each discovery had enormous significance while collectively it gave birth to so called "Modern Physics". It was the result of the collective efforts taken by the makers of the Modern Science, their approach and methods, dedication and sacrifice and desire to share their knowledge with others. Hence 1895-1905 decade is also known as "Golden Decade".

1905 was the most innovative year in which Albert Einstein published important papers that have drastically modified the theories of several scientist, the way we understand space, time, energy and mass. SR helps us understand the relation between mass and energy, i.e., they are interchangeable/equivalent. Space and time are not static. Papers published on SR & GR have completely changed our views about science and the Universe. In fact the very existence of life on the Earth is because of relativity that governs the production of energy in the Sun. These papers have affected our everyday life. Hundreds of gadgets, digital cameras, photocell, CD, DVD players, laser printers, scanners and many more that are based on Principles defined by Einstein.

Physics not only plays an important role in the development of science and technology but also has a tremendous impact on our society. Although physicist may be aware of this, the public is not. Hence its the need for celebrating the International Year of Physics.

In its statement on celebration of IYP, the United Nations General Assembly said, "The aim of this International Year goes beyond the celebration of one of the greatest minds in physics of the twentieth century. This year will provide the world with an opportunity for the largest possible audiences to acknowledge the progress and importance of this great field of science. One will remember, lasers, magnetic resonance imagery are pure products of the last decades of fundamental research in laboratories of physics., where tomorrow's materials and technologies of information are worked out today. We can stimulate the interest of young people to pursue scientific careers and to revive in them a taste for the scientific approach. This must be national as well as worldwide endeavour. It is indeed essential to understand that the twenty-first century will have an increasing need for the concepts and tools provided by the physical sciences in finding solutions to major problems which confront us, such as energy production, environmental protection and even public health.

As per the objectives of the IYP & century celebration of Einsteins theories, conference was arranged on 17th, 18th &19th November 2005. Eminent scientist from reputed institutions participated in the conference and presented their views.

I am sure that the conference would have helped the students / teachers and other Einstein lovers understand Einstein's Theories better.

On behalf of members of staff of Physics Dept. I thank Dr. V. V. Bedekar, Chairman Vidya Prasarak Mandal, Principal Dr. M. Pejaver, Dr. H. S. Bhanushali & other members of Marathi Vidnyan Parishad for their promising support. Our special thanks to Prof. Jayantrao Narlikar & other guest speakers, members of Advisory committee and participants of the conference that without their active support it would have not been possible to make the conference successful. We can't forget UGC, the major Sponsor and other Sponsors to the conference. Sincere thanks to all who have worked for the conference and the proceedings.

Prof. N. D. Mandage

Organising Secretary



Marathi Vidnyan Parishad, Thane Vibhag

Marathi Vidnyan Parishad, is an institute (Non Government Organisation) registered with Govt. and having Head Office "Vidnyan Bhavan", V. N. Purav Marg, Sion, Chunabhatti. The Parishad is further subdivided into various branches, affiliated to the central Head Office for convenience of working. Marathi Vidnyan Parishad has the privilege of having associated with world known scientists like Dr. Raghunath Mashelkar, Dr. Anil Kakodkar, Dr. Vasant Govarikar, Dr. Anand Karve & Dr. Jayantrao Narlikar. They are regularly participating and interacting in our programmes.

Ours is "Thane Vibhag" actively contributing since over last 35 years, working presently under the leadership of Dr. H.S. Bhanushali, a reknown surgeon, recently honoured by President of India.

Some of our Main Objectives are listed as under :

- 1) Propagation of Scientific views, scientific explanations behind the day to day happenings to common man in simplest ways.
- 2) Creating interest, mainly in Students of Science and Technological Development and research that is contributing to Development and Progress of the man kind.
- 3) To establish and encourage interaction between Scientists, Researchers with Students / Teachers and common man.

For achieving such important objectives we organise and hold various programmes like :

- i) Conducting series of Lectures for Students / Teachers in Schools & Colleges.
- ii) Training the Science Teachers of schools through co-ordination and involvement of IUCCA, Pune. These trained teachers in turn are expected to contribute in helping students in schools in respect of learning the Scientific principles behind every event including the toys and learning aids.
- iii) Participating in Programmes arranged by other organisations with presentations on subjects that are of interest and concern to common people, such as Health Awareness, Conservation of Energy, Zero Garbage concepts etc.
- iv) Presenting Models/Floats while participating in Processing arranged by others to arouse interest of spectators on subjects like Solar Energy, Pollution control, Conservation of Energy etc.
- v) Organising Exhibitions for Students and common people in which, students and some industries display their Experiments / Technologies that clarify scientific angles and details behind them.

Marathi Vidnyan Parishad, Thane Vibhag has organised three All India Science Conferences together with Science Exhibitions, during the last 35 years. Recently, during Dec. 2003, All India Marathi Vidnyan Conference was organised at Gadkari Rangayatan, Thane. Together with Science Exhibition at Shiv-Samarth Vidyalaya Grounds and Question / Answers

session between great Scientist Dr. Vasant Govarikar, Dr. V.G. Bhide and around 15,000 Schools/College Students, Teachers and Public in general at Dadoji Kondev Stadium.

All Teachers / Students and other citizens can join hands by becoming member of Marathi Vidnyan Parishad, Thane Vibhag.

Dr. H.S. Bhanushali

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VPM's B. N. Bandodkar College of Science, Thane

Vidya Prasarak Mandal (VPM) is a premier educational trust in Thane. B. N. Bandodkar College of Science is one of the several illustrious, model institutions belonging to VPM. The beginning of this institution, which now runs several schools & colleges, was very modest. On April 7, 1932, one secondary trained teacher named Trimbak Raghunath Ghanekar, started a small school with five children in one room of a bungalow in Thane's Naupada area. Soon he handed over the school to a Mandal, which obtained the Government's sanction for the school.

VPM was established in August 1935. Dr. V. N. Bedekar, former President had a dream of creating an 'Island of Knowledge' (Jnanadweepa) in Thane & with singular zeal, exemplary perseverance & with wholehearted support from his colleagues, succeeded in realizing it.

The next step was to start a college. The college was to be named as 'Balkrishna Naik Bandodkar College of Science'. The foundation stone of the Science College building was laid on 1st June 1969.

The 'Island of Knowledge' on which the various colleges of VPM now proudly stand was originally a marshy, muddy, barren piece of land. At high tide it was flooded with water & at low tide covered with mud, which has been developed into clean, spacious premises for the academic institutions. Each year brought fresh improvements & the process still continues. In June 1975, the affiliation of college was changed to University of Mumbai from University of Pune. VPM has gone through many vicissitudes while undertaking multifarious educational ventures during this span of time, and has come out very successfully not only in academic side but in other cultural activities also. VPM owes its prosperity to the generous help of donors and well wishers for which VPM is always grateful to them.

VPM'S INSTITUTIONS

- Dr. Bedekar Vidya Mandir [Marathi Medium]
- Sou. A. K. Joshi English Medium School
- B. N. Bandodkar College of Science
- K. G. Joshi College of Arts
- N. G. Bedekar College of Commerce
- TMC Law College
- V.P.M.'s Polytechnic
- V.P.M.'s Polytechnic IT Centre
- V.P.M.'s Advanced Study Centre
- Dr. V. N. Bedekar Institute of Research & Management Studies

In 1969, the college started with the department of Chemistry, Mathematics, Zoology, Physics & Botany. Statistics department started from 1977. now the college has the facility of imparting post graduation in Botany, Zoology & Chemistry, Ph.D in Zoology & B.Sc (Information Technology). The college has also the facility of M.Sc. (Information Technology). The unaided courses of Yashwantrao Chavan Maharashtra Open University (YCMOU) are B.Lib, M.Lib & journalism. Some faculty of the college are also the recognized guides for M.Sc & Ph.D at YCMOU

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(Emeritus Professor, IUCAA, Pune)

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B. N. Bandodkar College of Science, Thane

Three Day conference on

'Albert Einstein's Theories & Present Scenario'

by

Department of Physics

and

Marathi Vidnyan Parishad, Thane Vibhag

On 17th, 18th & 19th November 2005

PROGRAMME

Day 1st Thursday, November 17, 2005

13.30 Hrs. to 14.30 Hrs.	Registration
14.30 Hrs. to 15.30 Hrs.	Inauguration
15.30 Hrs. to 15.45 Hrs.	Tea
15.45 Hrs. to 17.00 Hrs.	Prof. Virendra Singh, TIFR, Mumbai (Albert Einstein : Miracle Year 1905)
18.00 Hrs. to 19.30 Hrs.	Prof. Jayantrao Narlikar Open Session : Gadkari Rangayatan
21.00 Hrs. to 00.00 Hrs.	Sky Observation - Thane College Campus Mr. D. K. Soman

Day 2nd Friday, November 18, 2005

8.30 Hrs to 9.00 Hrs	Tea / Snacks
Morning Session :	Chairman : Prof. S. J. Gupta, HOD, Department of Physics, University of Mumbai
9.00 Hrs. to 9.50 Hrs.	Prof. Urjit Yajnik, IIT, Mumbai (Einstein on Light : From waves to quanta and back)
9.50 Hrs. to 10.40 Hrs.	Prof. Jayantrao Narlikar, IUCAA, Pune (Theory of Relativity II : Time keeping in Special Relativity)
10.40 Hrs. to 11.00 Hrs.	Tea
11.00 Hrs. to 11.50 Hrs.	Prof. Jayantrao Narlikar (Einstein Theory of Special Relativity: Is it for ever)

11.50 Hrs. to 12.40 Hrs. Prof. Unnikrishnan, TIFR, Mumbai
13.00 Hrs. to 14.00 Hrs. **Lunch**

Afternoon Session : Chairman : Dr. J. J. Rawal

14.00 Hrs. to 14.50 Hrs. Prof. Unnikrishnan
14.50 Hrs. to 15.40 Hrs. Prof. T. P. Singh, TIFR, Mumbai
15.40 Hrs. to 16.00 Hrs. **Tea**
16.00 Hrs. to 17.00 Hrs. Prof. G. Ravikumar, TIFR, Mumbai
(A brief history of Photoelectric Effect 1905-2005)

Day 3rd Saturday, November 19, 2005

8.30 Hrs. to 9.00 Hrs. **Tea / Snacks**

Morning Session Chairman : Prof. Mayank Vahiya, TIFR, Mumbai

9.00 Hrs. to 9.50 Hrs. }
9.50 Hrs. to 10.40 Hrs. } Power Point Presentation
10.40 Hrs. To 11.00 Hrs. **Tea**
11.00 Hrs. to 11.50 Hrs. Prof. Arvind Kumar, Homi Bhabha Center, Mumbai
11.50 Hrs. to 12.40 Hrs. Prof. Ajit Kembhavi, IUCAA, Pune

13.00 Hrs. to 14.00 Hrs. **Lunch**

Afternoon Session : Chairman : Director, Nehru Planetarium

14.00 Hrs. to 14.50 Hrs. Prof. S. M. Chitre, TIFR, Mumbai
14.50 Hrs. to 15.40 Hrs. Prof. Mohan Apte, Mumbai
(Einstein's Theories in everyday life)
15.40 Hrs. to 16.00 Hrs. **Tea**
16.00 Hrs. to 17.00 Hrs. Concluding

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