

# Dr. Raka V. Dabhade, Ph.D.

## Present position

- Associate Professor, Department of Physics

## Contact Details (Mention e-mail) – fergusson.edu or despune.org



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## Work Experience

- Teaching: 30 years
- Research/Industrial: 20 years

## Personal Profile

Teaching in secondary school in my early career has taught me to connect with students immediately and I have the experience of teaching students from school to PG classes. I feel lucky to have interacted with students at various levels. Apart from routine teaching and science popularization, I am mostly engaged in evolving students from their routine stereotypes to become multi-faceted personalities with good civic sense, social responsibility and to impart good moral values in them.

## Course(s) Taught (Only Titles)

1. Atomic and Molecular physics
2. Astronomy and Astrophysics
3. Mechanics and properties of matter
4. Heat and thermodynamics
5. Renewable energy sources
6. Solid state physics
7. Waves and oscillations
8. Measurement techniques in physics

## Field of Specialization/Areas of Interests

- Materials science, plasma polymerization
- Astronomy and Astrophysics
- Atmospheric and Space sciences

## Education

- **Ph.D. –(Physics):** from: 1993 to 2004  
**Title of the Thesis: Studies on plasma polymerised MMA and plasma treated PMMA for use as humidity sensors**  
**Name of University / Institution: University of Pune, Pune**

**Year of Award :2004**

- **Master of Science/Arts- (Physics):** year: 1991  
University/College: Shivaji University Kolhapur
- **Bachelor of Science- (subject name):** year 1987  
College, University, Place, A.S.C. College, Ichalkaranji

**Fellowship/Awards/ Certifications/Achievements/Recognitions**

1. Received National, **INSA Teachers Award** from the Indian National Science Academy – **INSA** - Dec. 2019 at NIO Goa.
2. Received best project guide award: **R. Chandrashekhar Memorial award**, University of Pune. (by Prof. Pandit Vidyasagar)
3. Received **Best Teacher Award**: Uttar Bharatiya Sangh, Pune. (by Prof. Arun Nigwekar).
4. Best teacher award by Venus International Chennai
5. Received **Visiting Associateship at** - IUCAA 2020-2023.
6. Former Vice president, Indian Association of Physics Teachers – IAPT, Pune regional council.
7. Center in charge National Graduate Physics –NGPE.

**Member of College Committees/ Professional Bodies and Others**

College Level	Professional Bodies	Others
Worked on following committees :	<ol style="list-style-type: none"> <li>1. Life member, Indian Association of Physics Teachers,</li> <li>2. Life member, Astronomical Society of India.</li> <li>3. Member advisory committee, Bharti vidya bhavans, Exploratory</li> </ol>	
<ul style="list-style-type: none"> <li>● Library committee</li> <li>● TY BSc coordination committee.</li> <li>● IQAC member</li> <li>● College upkeep committee</li> </ul>		
<ul style="list-style-type: none"> <li>● Former Head of dept. from Nov.2016-Feb. 2022</li> </ul>		

**Employment History**

- 1) **Organization** : -----**The Modern High school, Ichalkarnaji**  
**Role** : -----**Teacher for 5<sup>th</sup> to 10<sup>th</sup> std.**  
**Duration** : ----- **1987-1992**

<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>● Teaching, preparing students for competitions, debate, cultural activities.</li> <li>● Taking sports sessions,</li> </ul>
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- 2) **Organization** : -----**N. Wadia college, Pune**  
**Role** : ----- **Lecturer, taught FY and SY classes**  
**Duration** : -----**1992-1993**

<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>● Theory teaching</li> <li>● Practical's of FY, SY and TY classes</li> </ul>
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- 3) **Organization** : -----**D.Y. Patil Engg. College, Pimpri**  
**Role** : -----**Teaching Applied physics with practical's**  
**Duration** : -----**August 1996 – Jan 1997**

<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>● Theory teaching</li> <li>● Conduction practical's</li> </ul>
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## Research Projects

Title of the Project	Name of Funding Agency	Amount (Rs)	Duration (Year) (From To)	Type (Minor / Major)	Outcome
Measurement of Atmospheric Aerosols	DST	36 lakhs	2019-2022	Major	
“FM Radio for meteor shower observations”	ISRO	3.25 Lakhs		Minor	
“Visual meteor shower observations”	ISRO	5 Lakhs		Major	
“Use of HAM radio for meteor shower observations”.	BCUD	2.5 lakhs		Minor	
“Fergusson College Observatory, an autonomous robotic telescope”.	ISRO	11 lakhs		Major	
“Use of Virtual Observatory for variable star observations”	UGC	1.5 lakhs		Minor	
“TARA Observatory”	Int. Astronomical Union	4,500 Euros		Minor	
“Fabrication of Celeostat for Solar observations”	BCUD	1.8 lakhs		Minor	

## Research Publications in National and International Journals

1. **Raka Dabhade**, C.D.Lokhande and S.H.Pawar, “Electrodeposition of CdSe and CdSeTe films and their performance in electrochemical photovoltaic cells”. Bulletin of Electrochemistry 7(7) July, (1991),p.319-323.
2. **Yermune, Raka Dabhade**, C.D.Lokhande and S.H. Pawar, “Studies on Electrodeposited Cadmium Chalcogenides”, Physics Teacher, April-June, (1988), p.154-158.
3. **Patil S.I. and Dabhade R.V.** “Magnetic Domain behavior of Cu and Co spinel Ferrite system” , IEEE Transaction vol.30, Issue6, Nov.(1994) p.4915-17.
4. **Dhananjay S.Bodas, Raka Dabhade, Sheetal Patil and S.A. Gangal**, “Comparative study of Spin coated and sputtered PMMA as an etch mask for Silicon micromachining”, Proc. IEEE, MHS (2001) 51-56.
5. **Dhananjay S.Bodas, Raka Dabhade, Sheetal Patil and S.A. Gangal**, “PMMA as an etch mask for Silicon Micro machining”, a feasibility study. Journal of Indian Institute of Science,81/6 (2001) 645.
6. **Makrand Risbud, Raka Dabhade, S.A. Gangal and R.R. Bonde**, “Radio frequency plasma treatment improves the growth and attachment of endothelial cells on poly-methyl methacrylate substrate” : implication in tissue engineering. Journal of Biomaterial Science –Polymer Edition, 13-10 (2002) 1067-80.
7. **R.V.Dabhade, Dhananjay Bodas and S.A. Gangal**, “Plasma treated polymer as a humidity sensing material, a feasibility study. Sensors and Actuators B,98 (2004) 37-40.
8. **R.V.Dabhade & Vaibhav Savant**, “Meteor observations from the Indian Sub-continent” Proceedings of the International Meteor Organization, 2010. <http://adsabs.harvard.edu/full/2011pimo.conf...22D>
9. **R.V. Dabhade**, Dhaval Pranjape & Yogita Kamble, “DSLR Photometry for Variable Star observations.” Proceedings of NSPTS-18, 2014.
10. Chetan Thakur & **R.V. Dabhade** “Virtual Observatory for plotting Variable Star light curves.” Proceedings of NSPTS-18, 2014.
11. Bulletin of Indian Meteorological Society, Pune chapter, special issue, Vol. 19, 1-3

## Published papers in The Indian Association of Physics Teachers IAPT convention, Proceedings:

1. “Physics for all in the 21<sup>st</sup> Century (2000).
2. “Long Live the Lecture!” (2000).
3. “Role of Physics teachers in teaching Environmental Science” 2004.
4. “Internet to support curriculum”.2005
5. “Science Club Activities as a means to attract students towards Pure Science”. 2011.
6. “Virtual observatory, tool for Astronomy projects in colleges”, 2012.

## Participation in Conferences/Seminars/Symposia/Workshop:

### Papers Presented, at International /National Conferences:

1. National conf. of Instruments Soc. of India at Cochin University of Science and Technology, Cochin. (Jaydeep Belapure & R.V. Dabhade) Oct.2005
2. National Seminar on Physics and Technology of Sensors (NSPTS-11), Pune. (Jaydeep Belapure) March 2006.
3. National Space Science Symposium, (NSSS-8), Andhra University, Vishakapatnam. (Jaydeep Belapure & R.V.Dabhade), Feb.2006.
4. **International** Conference on “Challenges for Solar Cycle-24”, Physical Research Lab.(PRL) Ahmedabad. (Bhaskar Agrawal & R.V. Dabhade) Jan.22-25, 2007.
5. **International Heliophysical** year workshop, Aryabhata Research Institute of Observational Sciences (ARIES) Nainital, (Sharmila Shirodkar & R.V. Dabhade) May 7-10, 2007.
6. National Space Science Symposium, (NSSS- 9), Radio Astronomy Center. Ooty. (Mukul Mhaske & R.V. Dabhade), Feb. 2008.
7. National Space Science Symposium, Rajkot (NSSS-10). Ankit Anand, Vaibhav Savant & R.V. Dabhade). Accepted for presentation 22-24<sup>th</sup> Feb.2010.
8. National Seminar on Physics and Technology of Sensors (NSPTS-15), Pune. (Vaibhav Savant & R.V. Dabhade). Presented and won the N.G. Patel 3<sup>rd</sup> prize for best presentation.
9. National Space Science Symposium, (NSSS- 11) Tirupati 2012. Suraj Dhiwar, Asmita Bhandare (**won the 2nd prize among research students category for best paper**) but they were students of **Third year BSc**.
10. National symposia on “Cloud precipitating process” Effect of coronal mass ejections on earth thermosphere. Bhavesh Rajpoot, Pratibha Mane and Raka Dabhade, Jan-march 2020 vol.19 no 1-3.

## Events Organized/Coordinated:

Sr. No	Name of the Event	Name of organizing Institute/ College/ University	Nature of contribution	Dates
<b>Seminars &amp; Workshops</b>				
1	<b>Frontiers in Physic XV</b>			<b>2022</b>
2	Workshop on Solar Physics,	Physics department	Coordinator	
3	National level antenna designing challenge	In collaboration with TLC IUCAA	Coordinator	16 <sup>th</sup> Sept. 2021
4	Two-day workshop on Python with Space applications	Collaboration with Space Nova	Coordinator	5 <sup>th</sup> - 6 <sup>th</sup> Dec. 2021

5	Frontiers in Physic XIV, inauguration by prof. Brian Schmidt, 2011 Nobel prize in physics.		Coordinator	<b>24<sup>th</sup>-25<sup>th</sup> March 2021</b>
6	Frontiers in Physic XIII For the first time in thirteen years of Frontiers in Physics National Students seminar, we had All the invited speakers who were the past students of the physics department		Coordinator	17 <sup>th</sup> & 18 <sup>th</sup> Feb. 2020
7	Two day workshop on Radio astronomy using Green bank observatory telescope		Coordinator	15 <sup>th</sup> 16 <sup>th</sup> October, 2019
8	Two-day National Seminar Frontiers in Physics XII		Coordinator	1 <sup>st</sup> 2 <sup>nd</sup> Feb. 2019
9	Two-day National Seminar Frontiers XIth in Solar Physics		Coordinator	Jan. 2018
10	Three-day National Seminar for students “Frontiers in Physics – Xth” Theme Astronomy frontier,		Coordinator	3rd -5th Feb. 2017
11	<b>One-day seminar on Solar Physics</b> , by Dr. Helen Mason		Coordinator	2016
12	Debate competition “ <b>Should colleges be given Autonomy</b> ”		Coordinator	2016
13	Two-day National Seminar for students “Frontiers in Physics IX”		Coordinator	2016
14	Two-day National Seminar for students “Frontiers in Physics VIII theme –International year of Light and light based technology and 100 years of Relativity		Coordinator	Jan. 28th-29th, 2015
15	Three-day National seminar for students “Frontiers in Physics VII theme - Frontiers in Astronomy” in collaboration with the Inter University for Astronomy & Astrophysics	In collaboration with IUCAA	Coordinator	Feb. 2014
16	Two day teachers workshop on teaching Astronomy and Astrophysics at undergraduate level	In collaboration with IUCAA	Coordinator	June 2013
17	Two-day Seminar for students “Frontiers in Physics VI” Jan		Coordinator	2013
18	Three day students workshop on Astrophysics of the Black hole systems	In collaboration with IUCAA	Coordinator	4-6th Sept. 2012
19	One day workshop on the Transit of Venus for school children		Coordinator	5th June 2012
20	Three day National Seminar for students “Frontiers in Physics V		Coordinator	Jan 2012
21	One day seminar for teachers on intellectual property rights		Coordinator	Nov 2011
22	Two day seminar “Frontiers in Physics IV		Coordinator	2011

23	Two-day seminar “Frontiers in Physics III		Coordinator	2010
24	<b>One-day seminar for Non-teaching faculty of Fergusson College</b>		Coordinator	February, 2009
25	Two-day state level seminar for teachers and students		Coordinator	
26	Two-day seminar “Frontiers in Physics II Theme - Astronomy		Coordinator	Feb. 2009
27	Three-day seminar “Frontiers in Physics I		Coordinator	2008
28	Two-day Telescope making workshop for 30 school children		Coordinator	May, 2008
29	Three-day seminar for students, (158 participants) “Frontiers in Physics		Coordinator	January, 2008
30	One-day lecture series of Four lectures to celebrate International Year of Physics		Coordinator	2005
31	Three-day Introductory School in Astronomy and Astrophysics		Coordinator	2002
<b><u>Exhibitions Organized</u></b>				
1	Mars Pathfinder		Coordinator	1997-1998
2	Apollo Missions to the Moon		Coordinator	1998-99
3	Sun and the Solar Eclipse		Coordinator	1999-2000
4	Touching the Sky with glory, on the Indian Air Force		Coordinator	1999-2000
5	ISRO- Past, Present and Future		Coordinator	2000-2001
6	In the wonderland of Physics		Coordinator	2001-2002
7	Close encounters with Mars		Coordinator	2003-2004
8	Cassinis date with Saturn		Coordinator	2004-2005
9	Hall of Relativity, to mark International Year of Physics		Coordinator	2004-2005
10	Sigma Information Universe, From the Big Bang to the Big Crunch		Coordinator	2005-06
11	The Sun, to mark the International Heliophysical Year		Coordinator	2007
12	Eyes on ISON (Comet)		Coordinator	2013
13	Mangalyaan. Mars Orbiter Mission		Coordinator	Sept 2014
14	Eyes on the Universe		Coordinator	Sept 2014
15	Remembering “Kalam”		Coordinator	August 2015
16	Indian Space missions and “Aditya”		Coordinator	2016
17	Omnipresent Science		Coordinator	2017
18	Unravelling the Cosmos		Coordinator	2018
19	Chandrayan – II and Space Exploration		Coordinator	6 <sup>th</sup> and 7 <sup>th</sup> Sept, 2019
20	Multi wavelength Astronomy		Coordinator	2021

<b>Public awareness of astronomical events organized</b>				
1	<b>Public awareness of Annular Solar Eclipse</b> in PCMC and PMC schools	collaboration with ASEEMT foundation	Coordinator	17 <sup>th</sup> December 2019
2	<b>Live Telecast of Chandrayan- II launch</b>	Astro club	Coordinator	22 <sup>nd</sup> July 2019
3	Observation of <b>Annular Solar Eclipse</b> from Kunnur by team of students with self-made Radio Telescope		Coordinator	26 <sup>th</sup> December 2019
4	Observation of <b>partial Solar Eclipse</b>		Coordinator	
5	Observational Astronomy session		Coordinator	10 <sup>th</sup> to 13 <sup>th</sup> Dec. 2019
6	Observation of the Venus Transit		Coordinator	2004
7	Observation of Total Solar Eclipse		Coordinator	29 <sup>th</sup> March 2006
8	Observation of Annular Solar Eclipse		Coordinator	15 <sup>th</sup> January, 2010
9	Observation of <u>Transit of Venus</u>	collaboration with Jotirvidya parisanstha	Coordinator	6 <sup>th</sup> June 2012
10	<b>Observation of the Comet ISON</b>		Coordinator	Oct. 2013

#### **Additional skills/Activities**

**Television Programs:** 12 Lectures recorded by Dr RV Dabhade, at Education Media Research Center-EMRC- Pune for Gyan Vahini, of Doordarshan, which have been telecast.

One **Radio program** was aired “**Science Magazine**” Pune Akashwani production where by Dr. Dabhade, Interviewed of Prof. Dipankar Bhattacharya, IUCAA, Prof. Gurfam Beigh, IITM, Prof. Ms Sashi Gangal, Univ of Pune,

1. Involved with Science Education Initiative- SEI activities.
2. Science popularization
3. Arranging guest lectures in collaboration with the British Consulate.
4. Carrying out an Asteroid hunt program with students. (Preliminary Asteroid discoveries have been made)
5. Carrying out Meteor shower observations with students.
6. Publishing in house science bulletin “Dimensions”

#### **Guided students for KVPY scholarships**

##### **Kishor Vidnyan Prothsahan Yojna (KVPY) scholars:**

1. Jaydeep Belapure
2. Parul Jain
3. Mayuresh Surnis
4. Abhilash Mishra
5. Prachi Telang
6. Indraja Jakhalkar – National Topper at KVPY

**Invited Talks Delivered:** 19 including one at **TEDx Salon Pune** “Why not innovate?”

## **Course Content Developed (e-content)**

1. E-content: Experimental videos of:
  - “Y” by bending experiment
  - “Viscosity by Poiseuille's method” experiment
  - “Double refraction prism”

### **Experimental set up of:**

1. “Observation of Fraunhofer lines in the Sun”.
2. “Solar constant”.
3. “Determination of the Sun's temperature”
4. “Solar Limb darkening experiment”
5. “Determination of Calorific value of Wood”
6. “Verification of Weins displacement law”

## **Consultancy Services**

1. Worked with KPIT Pune for selection of innovative projects for startups.