

P A Praveen

Senior Research Fellow

contact

Current Address

School of Physics
Bharathidasan University
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programming

♥ Fortran

Python, C++ & HTML5

mol packages

♥ MOPAC, dalton

Gaussian & AutoDock

other packages

LaTeX, Gimp

Gnuplot, Inkscape,
Tgif, Origin, ImageJ
& Libre Office Suite

experiments

Hydrothermal
deposition, Melt &
Solution growth,
Dielectric &
Hall measurements,
PXRD, Raman,
Z-Scan & SHG

education

2013–2018	Ph. D in Physics	Bharathidasan University Tiruchirappalli
	Benzimidazole based metal organic nanostructures for nonlinear optical applications	
2011–2013	Free Lancer	Bharathidasan University Tiruchirappalli
	Improvising optical properties of organic thin films by metal dopants (Crystal Growth Laboratory, Dept. of Physics)	
2009–2011	Post Graduation in Physics	Bharathidasan University Tiruchirappalli
	First Class with CGPA 7.5	
2006–2009	Under Graduation in Physics	Periyar University Salem
	First Class with 80%	
2004–2006	Higher Secondary	M.H.S. School Karur
	First Class with 65%	
2004–2006	Secondary Schooling	M.H.S. School Karur
	First Class with 89%	

research

Doctral Work

2013–Now **METAL ORGANIC THIN FILMS FOR NLO APPLICATIONS**
Studied the variation in optical and thermal stability of the benzimidazole ligand with the incorporation of first row transition metal ions. Bis type benzimidazole metal complexes are used for the investigation. The potentiality of the complexes were verified computationally prior to the experimental fabrication. Synthesized materials shown better optical transmittance, high thermal stability, enhanced SHG efficiency and good third non-linear susceptibilities.

Important achievements:

- Developed an improved version of chemical solution processing unit
- Physisorption based chemical deposition theory have been successfully developed
- Metal organic thin films of benzimidazole were deposited for the first time

- PM6 and PM7 methods are validated for polarizability calculations
- Solid state calculation were carried out for polarizability calculations on metal complex/polymer composites for the first time
- All the samples were demonstrated to have either one of the applications such as optical limiting, optical switching or laser assisted anti-cancer activity

Free Lancing Period

2011–2013 **METAL DOPED BENZIMIDAZOLE THIN FILMS FOR NLO APPLICATIONS**
Benzimidazole thin films shown low transmittance value due to the optical scattering effect. The optical transmittance quality of the films was increased by doping manganese ions in the organic medium. Fabricated films shows better optical transmittance with improved third order nonlinear susceptibility.

Post Graduation Project

2010–2011 **PREPARATION & CHARACTERIZATION OF BENZIMIDAZOLE THIN FILMS FOR NLO APPLICATIONS**
Benzimidazole thin films were deposited and its third order nonlinear susceptibility values were calculated for the first time. Nanocrystalline thin films were deposited by chemical bath deposition method and characterized. It is found that the crystalline size and surface homogeneity plays a vital role in linear optical transmittance and third order nonlinear optical properties.

Project Assistance

2017–2018 **THEORETICAL ANALYSIS OF FIRST ROW TRANSITION METAL SUBSTITUTED ZIF STRUCTURES** M. Sc., Project
This work explores the geometry and electronic structure of six different first row transition metal ions and their polarizability, hyperpolarizability and spin density properties.

2016–2017 **COPPER BASED METAL ORGANIC FRAMEWORKS FOR NONLINEAR OPTICAL APPLICATIONS** M. Phil., Project
In this work Cu-MOF nanoparticles were deposited by solvothermal method. The structural and optical properties of the samples were analysed by both theoretically as well as by experimentally. Obtained results confirmed the potentiality of the samples towards NLO applications.

- 2016–2017 **THEORETICAL & EXPERIMENTAL ANALYSIS OF CADMIUM BASED ZEOLITIC IMIDAZOLE FRAMEWORKS** M. Sc., Project
 This work discusses the deposition and characterization of one of the well known MOF's, Cadmium Imidazolate Framework (CIF) thinfilms by solvothermal method. The computational analysis confirms the better potentiality of CIF than ZIF and the experimental analysis confirmed that the samples have good third order nonlinear optical properties.
- 2015–2016 **PREPARATION & CHARACTERIZATION OF ZIF-8 THIN FILMS FOR NON-LINEAR OPTICAL APPLICATIONS** M. Sc., Project
 Characteristics such as the straight forward synthesis, predictable structure and pore sites make MOF's as an attractive candidate for photonic applications. This work discusses the deposition and characterization of one of the well known MOFs, Zeolitic Imidazole Framework (ZIF-8) thin films by solvothermal method and reports the linear and nonlinear optical properties of deposited films.
- 2014–2015 **UNDOPED & Pd DOPED ZnO NANOPARTICLES FOR THIRD ORDER NON-LINEAR OPTICAL APPLICATIONS** M. Sc., Project
 Undoped and Pd doped ZnO nanoparticles were synthesized by simple chemical precipitation method. SEM images and powder XRD analysis confirms the nanocrystalline nature of the synthesized particles. SHG and Z-Scan analysis shows the Pd doped ZnO nanoparticles have better nonlinear optical properties than that of the undoped of ZnO particles.
- 2013–2014 **SYNTHESIS & CHARACTERIZATION NOVEL QUINOLINE DERIVATIVE FOR NLO APPLICATIONS** M. Sc., Project
 One of the quinoline derivatives bis-quinoline-perchlorate was computationally designed and synthesized. The product was confirmed by FTIR and powder XRD analysis. Linear optical and dielectric studies suggests the potentiality of the material towards nonlinear optical applications. Theoretical third order nonlinear optical properties are also ensured the same.

awards

- 2016 **BSR Scholarship (SRF)** UGC, New Delhi
 Awarded a senior research fellowship for meritorious scholars to carry over the research work extended for the period of three years
- 2014 **BSR Scholarship (JRF)** UGC, New Delhi
 Awarded a junior research fellowship for meritorious scholars to carry over the research work for the period of two years
- 2009 **Class Topper** Under Graduation
 Secured class topper position in the under graduation programme.
- 2008 **Class Topper** Under Graduation
 Named as the top scorer of the second year of under graduation students.

presentations

- Feb, 2018 **One Day Workshop on \LaTeX** Dr. SNSR College of Arts & Science
Served as a resource person and taught \LaTeX fundamentals and report compilation
- Mar, 2017 **21st National Seminar on Crystal Growth and Applications** National College, Tiruchirappalli
Presented a talk on role of annealing on third order nonlinear optical properties of Mn-BMZ thin films and named as best paper
- Dec, 2016 **61st DAE Solid State Physics Symposium** KIIT University, Bhubaneswar
Presented a poster on theoretical and experimental analysis of optical properties of novel Zn based benzimidazole metal complexes
- Dec, 2016 **National Conference on Computational and Experimental Physics of Functional Materials** K.S.R College of Arts and Science for Women, Tiruchengode
Presented a talk on role of annealing on third order nonlinear optical properties of Mn-BMZ thin films and named as best paper
- Dec, 2015 **60th DAE Solid State Physics Symposium** Amity University, Noida
Presented a poster on theoretical evaluation of role of substituents on linear and nonlinear polarizabilities of benzimidazole based metal complexes.
- Dec, 2015 **DST SERB School on Modern Optics** Indian Institute of Technology, Patna
Presented a poster on metal-organic thin films for thermo-optical limiting and switching applications.
- Dec, 2014 **59th DAE Solid State Physics Symposium** VIT University, Vellore
Presented a poster on validation of PM6 and PM7 semiempirical methods towards the polarizability and hyperpolarizability calculations.
- Nov, 2014 **DST SERB School on DFT and Beyond** M. S. University, Vadodara
Presented a talk from part of my research work, focused on the deposition and characterization of Co(II) benzimidazole metal complex films and acquired a third prize in the competition.
- Dec, 2013 **58th DAE Solid State Physics Symposium** Thapar University, Patiala
Presented a poster on role of Mn dopants on the linear and nonlinear optical properties of benzimidazole thin films

training programs

- Feb, 2018 **Asia Pacific Academy of Materials Special Lecture Series** Special Lecture Series
Centre for High Pressure Research, Bharathidasan University, Tiruchirappalli

Jan, 2016	Green Energy Technologies Department of Environmental Management, Bharathidasan University, Tiruchirappalli	Workshop
Dec, 2015	Modern Optics and Its Applications Department of Physics, Indian Institute of Technology, Patna	SERB School
Jan, 2015	Strongly Correlated Materials Centre for High Pressure Research, Bharathidasan University, Tiruchirappalli	International Workshop
Nov, 2014	Density Functional Theory and Beyond Department of Physics, M. S. University, Vadodara	SERB School
Aug, 2014	Resources and Technologies for Scholarly Information Department of Library and Information Science, Bharathidasan University, Tiruchirappalli	Workshop
Mar, 2014	Recent Advances in Materials Chemistry Department of Chemistry, Anna University, Tiruchirappalli	Workshop
Feb, 2014	Advances in Nanotechnology Centre for Nanoscience and Nanotechnology, Bharathidasan University, Tiruchirappalli	Workshop
Jan, 2014	A Training Program on Research Writing Centre for Technical and Academic Writing, Bharathidasan University, Tiruchirappalli	Workshop
Oct, 2013	Photocatalysis for Sustainability Department of Chemistry, Anna University, Tiruchirappalli	Workshop
Feb, 2013	Scientific Applications of Powder XRD Centre for Instrumentation and Maintenance Facility, Periyar University, Salem	Workshop
Dec, 2013	Recent Trends in Materials Research Department of Physics, National Institute of Technology, Tiruchirappalli	Workshop
Mar, 2008	Recent Developments in Nanomaterials Research Department of Physics, Periyar University, Salem	Workshop

conferences

Feb, 2018	29st National Symposium on Advances in Functional & Exotic Materials Symposium Centre for High Pressure Research, Bharathidasan University, Tiruchirappalli
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Dec, 2016	61st DAE Solid State Physics Symposium KIIT University, Bhubaneswar	Symposium
Dec, 2016	National conference on Computational and Experimental Physics of Functional Materials K.S.R College of Arts and Science for Women, Tiruchengode	Symposium
Dec, 2015	60th DAE Solid State Physics Symposium Amity University, Noida	Symposium
Dec, 2014	59th DAE Solid State Physics Symposium VIT University, Vellore	Symposium
Feb, 2014	Recent Advances in Materials Science Department of Physics, Bharathidasan University, Tiruchirappalli	Seminar
Feb, 2014	Recent Trends in Novel Materials Centre for High Pressure Research, Bharathidasan University, Tiruchirappalli	Seminar
Dec, 2013	58th DAE Solid State Physics Symposium Thapar University, Patiala	Symposium
Jan, 2009	Recent Advances in Spectroscopy Department of Physics, Kandaswami Kandari's College, Namakkal	Seminar

online courses

Mar, 2018	HTML Fundamentals Course Certificate issued by SoloLearn
Mar, 2018	Conference skills for researchers Certificate issued by Elsevier Researcher Academy
Mar, 2018	How to promote your research for maximum impact Certificate issued by Elsevier Researcher Academy
Mar, 2018	Social media for researchers Certificate issued by Elsevier Researcher Academy
Apr, 2018	What is open science? Certificate issued by Elsevier Researcher Academy
Apr, 2018	Beginners guide to writing a manuscript in \LaTeX Certificate issued by Elsevier Researcher Academy
Apr, 2018	Funding hacks for researchers Certificate issued by Elsevier Researcher Academy
Apr, 2018	C++ Tutorial Course Certificate issued by SoloLearn
Apr, 2018	PHP Tutorial Course Certificate issued by SoloLearn

academic positions

2018	Joint Secretary and Joint Treasurer	Physics Forum
	School of Physics, Bharathidasan University, Tiruchirappalli	
2018	Recognized Reviewer	Elsevier Publications
	Reviewer of Spectrochimica acta part a molecular and biomolecular spectroscopy	
2018	Tutor	Materials Science Laboratory
	Department of Physics, Bharathidasan University, Tiruchirappalli	
2011	Class Representative	M. Sc., (II Year)
	School of Physics, Bharathidasan University, Tiruchirappalli	
2009	Secretary	Physics Association
	Department of Physics, Kandasami Kandars College, Namakkal	
2008	Joint-Secretary	Physics Association
	Department of Physics, Kandasami Kandars College, Namakkal	

academic activities

2018	Organizing Secretary	National Science Day Celebrations
	Organized the National Science Day celebrations in School of Physics, Bharathidasan University and managing the entire event	
2017	Organizing Committee Member	National Science Day Celebrations
	Organized the National Science Day celebrations in School of Physics, Bharathidasan University. Played a significant role in setting up questions for quiz program and the creation of an entertainment event and managing events	
2016	University Rank Exam	PG Admission
	I was one of the member of university rank exam Committee and played a role exam arrangements.	
2016	Team Member	PG Admission
	I was one of the member of verification committee played a role in scrutinizing the applications.	
2015	Team Member	IQAC - Academic Audit
	Served in the Internal Quality Assessment Cell of Bharathidasan University during the academic audit, 2015 and assisted in collecting and processing the technical data	

- 2015 **Organizing Committee Member** National Science Day Celebrations
 With two other colleagues organized the National Science Day celebrations in School of Physics, Bharathidasan University. Played a significant role in setting up questions for quiz program and the creation of an entertainment event
- 2015 **Team Member** PG Admission
 I was one of the member of verification committee played a role in scrutinizing the applications.
- 2014 **Team Member** PG Admission
 I was one of the member of verification committee played a role in scrutinizing the applications.
- 2014 **Team Member** Seminar on Recent Advances in Materials Science
 I'm as one of the member of local organizing committee played a vital role in website, abstract book, certificates, CD wrappers, memento and Flex board design. I'm also assisted with the stage arrangements and presentation operations. Delivered a welcome address to the gathering at valedictory session.
- 2010 **Organizing Secretary** National Science Day Celebrations
 With one another colleague, organized the National Science Day celebrations in School of Physics, Bharathidasan University. Played a role in finalizing the quiz questions, supervising the events and in certificate design.
- 2009 **Team Member** Seminar on Recent Advances in Spectroscopy
 I was one of the member of organizing committee played a vital role in abstract book design. Also assisted with stage arrangement and presentation operations.

extra-curricular activities

- 2016 **Hostel Committee Member** Research Scholar's Hostels
 Served as a member of hostel committee, which is the sole responsible for the functioning of research scholars hostels, carrying the duties include website maintenance, workers management and maintenance of hostel records.
- 2015 **Web Site Design** Research Scholar's Hostels
 Designed a fully functioning website for the research scholars hostels, which includes the form downloads, online enquiry system, online mess bill payment option, and online mess bill and monthly expenditure viewing facility.

2015	Android App Design	Research Scholar's Hostels
	Designed two versions of fully functioning android applications which substitutes the requirement of using website in smart phones. Considering the lower and higher end devices, the application was designed as lite and pro versions.	
2014	Web Site Design	RAMS Conference
	Designed a fully functioning website contains the details of the conference, list of speakers and an online application facility.	
2014	Organizer	Badmiton Event
	Organized an badmiton event for the research scholars in Porunai and Vaigai hostels of Bharathidasan University, Tiruchirappalli.	
2013	Hostel Committee Member	Research Scholar's Hostels
	Served as a member of hostel committee and carried out the works include the workers management and maintenaning the food quality.	

professional activites

- Co-founder of a digital publication eInk Solutions
- Chief editor of more than 125 ebooks

interests

Research: Modeling, fabrication and characterization of photonic materials, molecular mechanics and drug design

Professional: Digital Publications, Web Design, Android App Creation, Automation Processes, Infographics, Data Analysis

Personal: Photography, Blogging, Badmiton, Chess, Cooking, Travel, Carnatic fusion

publications

articles



1. Theoretical and experimental evaluation of structural and optical properties of novel zinc- benzimidazole metal complex doped in polystyrene matrices, P. A. Praveen, R. Ramesh Babu, AIP Conference Proceedings 1832 (2017) 140038.
2. Role of annealing on the structural and optical properties of nanostructured diaceto bis- benzimidazole Mn(II) complex thin films, P.A. Praveen, R. Ramesh Babu, K. Ramamurthi, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 173 (2017) 800.
3. Theoretical and experimental investigations on linear and nonlinear optical response

- of metal complexes doped PMMA films, P. A. Praveen, R. Ramesh Babu, K. Ramamurthi, Mater. Res. Express 4 (2017) 025024.
4. Effect of substituents on polarizability and hyperpolarizability values of benzimidazole metal complexes, P. A. Praveen, R Ramesh Babu, AIP Conference Proceedings 1731 (2016) 090013.
 5. Validation of PM6 and PM7 semiempirical methods on polarizability calculations, P. A. Praveen, R. Ramesh Babu, K. Ramamurthi, AIP Conference Proceedings 1665 (2015) 609.
 6. Spectral, morphological, linear and nonlinear optical properties of nanostructured benzimidazole metal complex thin films, P.A. Praveen, R. Ramesh Babu, K. Jothivenkatachalam, K. Ramamurthi, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 150 (2015) 280.
 7. Low power optical limiting studies on nanocrystalline benzimidazole thin films prepared by modified liquid phase growth technique, P.A. Praveen, S. P. Prabhakaran, R. Ramesh Babu, K. Sethuraman, K. Ramamurthi, Bulletin of Materials Science 38 (3) (2015) 645.
 8. Linear and nonlinear optical properties of Mn doped benzimidazole thin films, P. A. Praveen, R. Ramesh Babu, S. P. Prabhakaran, K. Ramamurthi, AIP Conference Proceedings 1591 (1) (2014) 991.
 9. Laser assisted anticancer activity of benzimidazole based metal organic nanoparticles, P.A. Praveen, R. Ramesh Babu, P. Balaji, A. Murugadas, M.A. Akbarsha, Journal of Photochemistry & Photobiology, B: Biology 180 (2018) 218.



books

1. Semiempirical Modeling and Experimental Evaluation of Benzimidazole Based Metal-Organic Complexes for Nonlinear Optical Applications, P. A. Praveen, R. Ramesh Babu, Springer, In Press, In the book Theoretical Materials Design: Optimization, Simulation and Experimental Realization.
2. Gravitational Waves Explained, P. A. Praveen, el Trendz (2018) Tiruchirappalli.



references

Supervisor **Dr. R. Ramesh Babu**  +91 994 206 0925,  rampap2k@yahoo.co.in
Assistant Professor, Department of Physics
Bharathidasan University, Tiruchirappalli

He taught me 'Solid State Physics' during my post graduation and also assisted me in the PG project. Presently, I'm pursuing doctoral studies under his guidance.

Collaborater **Prof. K. Ramamurthi**  +91 994 267 5899,  krmurthin@yahoo.co.in
Professor and Former Head of School of Physics, Bharathidasan University
Department of Physics and Nanotechnology
SRM University, Kancheepuram

He was our former head of the department and the supervisor of my PG project. For my doctrol studies he assists me in different ways and co-authored four of my manuscripts.

Teacher **Dr. K. Ravichandran**  +91 984 062 1125,  kravichandran05@gmail.com
Assistant Professor, Department of Physics
Kandaswami Kandar's College, Namakkal

He taught me 'Solid state physics and Magnetism' during my under graduation. I had worked under him to organize a national level conferene.

declaration

I hereby declare that all the details furnished above are true to the best of my knowledge and belief.

P. A. Praveen