

## RESUME



**Name** : DAKSHINA MURTHY POTUKUCHI  
(potukuchidm@yahoo.com)

**Present Position** : Head & Associate Professor in Physics  
Jawaharlal Nehru Technological University, College of  
Engineering, Kakinada-533003, India..

**Qualifications** : M.Sc. (Nagarjuna Univ.- Solid State Physics - 1983)  
Ph.D. (Nag.Univ.- Phase Transitions in Liquid Crystals - 1989)

### Teaching Experience

PG Nag. Univ. -M.Sc. - 3yrs **-12yrs**

JNTUniv. -M.Tech.- 9

UG JNTUniv, -B.Tech. - 9

**Research Field** Soft-Condensed Matter (Exptl)- Materials Science- LIQUID CRYSTALS

Pre-Doctoral Nag. Univ. -URF(UGC), SRF(CSIR) 3.5 -21Yrs

Post-Doctoral Nag. Univ. -R.A(CSIR) 5

Nag.Univ. - Scientist-B(AICTE) 2

Research Guidance JNTUniv., -Faculty 9.5

Referee to Journals Materials Research Bulletin(Elsevier)

Details of Research Guidance

- **3Ph.Ds**

*Title & Field of Work*

- 1)Influence of Hydrogen Bonding on Ferro-electricity in Liquid Crystals
- 2)Characterization and Low-frequency Dielectric Investigations in Bent Liquid Crystals
- 3)Spectroscopic Studies of Diatomic Molecules

*Areas of Research Intrerest:* Achiral, Chiral and Supra-molecular Liquid crystals for Optical Display Devices.

*Interdisiplinary Area of Research:*Face Recognition, Image Processing, Microwave Medical Diagnostic Techniques, & Late Potentials- Wavelet Analysis to ECG

**Research Publications** - 50 + 5 (communicated) **-55**  
( Intl. Journals) **(List enclosed)**

**Best Teaching Awards** - Best Teacher (among Basic Sciences&Humanities) - 2- times  
JNTUniv, Kakinada 200-04 &2004-08.

**Administrative Expern-** Head of Department- Board of Studies Chairman- Chief-Evaluation- Observer and Vigilance Squad univ. Exams- Co-ordinator and Member in Affiliation and Fact Finding Committees- Paper Setter-Magazine Committee.

**Objectives** : Pursue a career involving **Academics & Research in Physics**

## CURRICULAR VITAE OF Dr. D. M. POTUKUCHI

### A) PERSONAL DETAILS:

1. NAME : DAKSHINA MURTHY POTUKUCHI
2. ADDRESS : PRESENT Head, Department of Physics  
JNTU Univ. College of Engineering  
KAKINADA –533 003.  
(AP). INDIA. PERMANENT c/o P.Seshadri  
11-18-29 Ramireddypet  
NARASARAOPET– 522 601  
(AP). INDIA.
3. PRESENT POSITION : Head & Associate Professor in Physics, Jawaharlal Nehru  
Technological University, India.
4. DATE OF BIRTH : 04-04-1957
5. NATIONALITY : Indian
6. PASSPORT DETAILS : Number - B 0463804  
Place of Issue - Hyderabad  
Date of Issue - 13-8-1999  
Date of Expiry - 12-8-2009
7. NAME OF SPOUSE : Rupa  
AND OTHER DETAILS
8. DETAILS OF CHILDREN : One Male Child – Venkatram Ambareesha.

### B) EDUCATIONAL QUALIFICATIONS:

B.Sc.	Andhra Univ, India	Physics, Maths and Chemistry	First Class	1981
M.Sc.	Nagarjuna Univ, India	Solid State Physics	First Class	1983
Ph.D.	Nagarjuna Univ, India	Liquid Crystals – Phase Transitions		

### C) EMPLOYMENT HISTORY :

- a) Teaching : i) CSIR Honorary Lecturer for B.Sc courses – 5 yrs. (1990-95)- Waves and Oscillations, Heat and Thermodynamics  
ii) PG Lecturer for M.Sc course – 3 yrs (1994-97)  
-Solid State Physics  
iii) Asst. Prof JNTUUniv- course–9 yrs (1997+2 -2004)  
Associate Prof.- 2004- till now – 2 yrs  
Applied Physics, Engineering Physics.  
iv) PG-Theories of Dielectric Breakdown for M.Tech Course-  
3yrs.  
v) PG-Lecturer for M.Sc-AUPG center (Rajiv Gandhi College  
of Management Sciences)(zero hours) – 3 yrs.
- Best Teacher Award : 2 times 2000-04 & 2004-08 out going B.Tech students.
- b) International Exposure : Visiting Consultant for SQ Univ, Muscat – 4 months (2001)

D) RESEARCH PROFILE :

1. Pre-doctoral

i) **Univ.Grants Commission – Univ. Research Fellowship-1.5 yrs**

Investigation of Internal Electric Field Problem in Nematic Liquid Crystals-Molecular Orientational Polarizabilities– Design Of a Modified Laboratory Spectrometer to measure Nematic Birefringence.

ii) **Council of Scientific & Industrial Research – Senior Research Fellowship – 2 years.**

Optical and Dilatometric Studies of Tricritical Points across Nematic – Smectic – A transition and Lambda – line analogy Modelling of NA transition and Tricritical Point.

2. Post-doctoral

**:Council of Scientific & Industrial Research**

**Research Associate – 5 years**

Pre-transitional Effects and Order Parameter fluctuations, Growth of Correlation Lengths at Isotropic to LC transitions Through Dilatometry, Differential Scanning Calorimetry and Optical studies. Low-frequency Dielectric Relaxation in Smectic Liquid Crystals.

3. Research Scientist

**:All Indian Council of Technical Education – Project Research Scientist-B – 2 years.**

Investigations of suitability of Ferroelectric Liquid Crystals Arrays in Reprographic and Image Processing displays. Study of Ferroelectric Liquid Crystals Transitions by Dilatometry. Measurement of Spontaneous Polarization, Tilt Angle, Switching Times and Torsional Viscosity in FLC-C\* phase.

4. Faculty Member

**:Low-Frequency Dielectric Relaxations and Collective Excitations of Soft-Mode and Goldstone Modes in C\* phase for the Tilt and Helix fluctuations – Activation Energies – Dipole Dynamics and LF- Liquid Crystal Dipole Response, Influence of Hydrogen bonding in Ferroelectricity in LCs-Supra-molecular aspects and Banana LCs-Dipole Dynamics during Collective excitations.**

E) RESEARCH INTEREST & RELEVANCE

**:Fundamental aspects : Soft Condensed Matter – Liquid Crystalline Phase Transitions with rare Crystal 1-D, 2-D and Quasi-2D, Hexatic Ordering symmetry, Low frequency Dielectric Relaxations and Study of collective excitations – Soft and Goldstone Mode Dynamics-Supra-molecular aspects and the influence on FE and AFLC phases.-Crystallization Kinetics by calorimetry at Hexagonal LC interfaces.**

**Applied Aspects: Synthesis and Display Device Operational Characterization of Chiral and Achiral (Supra-molecular) Ferro Electric and Antiferroelectric Liquid Crystals, Spontaneous Polarization, Tilt Angle, Switching Times and Viscosity for their suitability in devices. FE/AFE Switching in Bent phases.**

*Interdisciplinary Areas:* Image Processing and Face Recognition techniques, Script Processing and Recognition, Microwave Diagnostic Techniques. Wavelet Transforms-Late Potentials in ECGs.

F) RESEARCH GUIDANCE : **3 Ph.Ds.**

- Title – 1. “Spectroscopic Studies of Diatomic Molecules” –(awarded in 2004)  
2. “Synthesis, Characterization and Low-Frequency dielectric Investigations in Banana Liquid Crystals” –(Awarded 2006)  
3. ”Influence of Hydrogen Bonding on Ferroelectric Liquid Crystals” –(awarded 2006)

G) MEMBERSHIP IN PROFESSIONAL BODIES :Indian Liquid Crystal Society(ILC), Institution of Electronics and Telecommunication Engineers(IETE).  
Bharat Scouts and Guides, Indian Red-Cross Society.

H) LIST OF PUBLICATIONS: - 51 (Internatl.Res.Journals)  
.-**Published 48, commun-3.**

I) REFEREES

:1)**Dr. D.P.Ojha,**  
Professor & Head  
Post-Graduate Department of Physics  
Andhra Layola College  
Vijayawada- 520008.  
INDIA.  
([mail-durga\\_ojha@hotmail.com](mailto:mail-durga_ojha@hotmail.com))

2) **Dr.B.Prabhakar Rao,**  
Professor in Electronics & Communications Engg.,  
Vice-Principal, JNTUniv., College of Engineering  
Kakinada-533003.  
A.P., INDIA. (mobile-9848451465)  
([E-mail-drbpr@rediffmail.com](mailto:E-mail-drbpr@rediffmail.com))

3)**Prof.A.K. George** (E-mail:[akgeorge@squ.edu.om](mailto:akgeorge@squ.edu.om))  
Department of Physics  
College of Sciences, Post Box-36  
Sultan Qaboos Unievsity  
Al-Khoudh, Muscat, PC.-123  
Sultanate of OMAN.

4)**Prof.V.Ravindranath**  
Head & Professor in Mathematics  
College of Engineering  
Jawaharlal Nehru Technological university  
KAKINADA-533003  
A.P., INDIA.  
(E-mail:[nath\\_vr@yahoo.com](mailto:nath_vr@yahoo.com))

## LIST OF PUBLICATIONS

1. Density and Ultrasonic Velocity studies in N(p-n-heptyloxy benzylidene) p-n-pentyl aniline.  
NVS.Rao, Y.Gowrisankar, **D.M.Potukuchi** and VGKM.Pisipati.  
*Phase Transitions*, V.7, p.49-58(1986).
- 2\*. Density, Refractive Index and Ultrasonic Velocity studies involving N(p-n-hexyloxy benzylidene) p-n-octyl aniline.  
VGKM.Pisipati, MK.Rao, PR.Alapati, **D.M.Potukuchi** and NVS.Rao.  
*Molecular Crystals and Liquid Crystals*, V.146, p.89-96(1987).
- 3\*. Density studies in Terephthalylidene-Bis-p-n-Decyl aniline.  
VGKM.Pisipati, NVS.Rao, PR.Alapati and **D.M.Potukuchi**.  
*Molecular Crystals and Liquid Crystals*, V.146, p.111-119(1987).
4. Phase Transitions by Density studies in Terephthalylidene-Bis-p-n-Dodecyl aniline.  
PR.Alapati, **D.M.Potukuchi**, NVS.Rao, D.Saran and VGKM.Pisipati.  
*Molecular Crystals and Liquid Crystals*, V.146B., p119-125(1988).
5. Phase Transitions and Structural investigations in 50.5, 50.6 and 50.7.  
PR.Alapati, **D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati.  
*Liquid Crystals*, V.3, p.1461-1479(1988).
6. N-SA Transition First or Second order: A Tricritical Point in N(p-n-Alkyloxy benzylidene) p-n-Alkyl Anilines.  
VGKM.Pisipati, **D.M.Potukuchi**, PR.Alapati, PB.Rao and NVS.Rao.  
*Molecular Crystals and Liquid Crystals*, V.167, p.167-171 (1989).
7. Phase transition studies in 40.12.  
**D.M.Potukuchi**, K.Prabhakar, NVS.Rao and VGKM.Pisipati.  
*Molecular Crystals and Liquid Crystals*, V.167, p.181-189(1989).
8. Phase Transition studies across Isotropic – Smectic –A and Smectic-A-Smectic-F phases in 90.4.  
**D.M.Potukuchi**, PB.Rao, NVS.Rao and VGKM.Pisipati.  
*Z.Naturforsch.A.*, V.44, p.23-25(1989).
9. Liquid Crystalline Phase Transition studies in N(p-n-butyloxy benzylidene)p-n-decyl aniline, 40.10.  
NVS.Rao, **D.M.Potukuchi**, PN.Rao and VGKM.Pisipati.  
*Crystal Research and Technology*, V.24, p.219-225 (1989).
10. Phase Transitions studies in 50.5 and 90.4.  
NVS.Rao, PR.Alapati, **D.M.Potukuchi** and VGKM.Pisipati.  
*Liquid Crystals*, V.5, p.545-551(1989).
11. Molecular Polarizabilities in N(p-n-Alkyloxy benzylidene)p-n-Alkyl anilines.  
VGKM.Pisipati, NVS.Rao, **D.M.Potukuchi**, PR.Alapati, D.Saran and A.G.Petrov.  
*Bulgarian Journal of Physics*, V.16, p.93-104(1989).
12. Orientational-Translational Coupling for Nematic-Smectic-A Tricritical Point:A Birefringence study.  
**D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati.  
*Journal of Molecular Liquids*, V.50, p.1-12(1990).

13. Phase transitions in N(p-n-butyloxy bezylidene)p-n-alkyl anilines by Density and Refractive Index studies.  
NVS.Rao, **D.M.Potukuchi**, and VGKM.Pisipati.  
*Molecular Crystals and Liquid Crystals*, V.**196**, p.71-87(1991).
14. McMillan Parameter as an effective Field Variable for Nematic-smectic-A Tricritical Point.  
**D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati.  
*Phase Transitions*, V.**37**,p.191-202(1992).
15. Phase Transitions in Liquid Crystals 90.6 and 90.8.  
NVS.Rao, PV Sankar Rao, **D.M.Potukuchi** and VGKM.Pisipati.  
*Liquid Crystals*, V.**12**, p.127-135(1992).
16. Phase transition studies in some 4-n-Alkyl-N-(4-n-alkyloxy-benzylidene)-Anilines  
P.B.Rao, **D.M. Potukuchi**, J.S.R. Murthy, N.V.S Rao and V.G.K.M. Pisipati  
*Crys. Res. and Tech.*, **27**, 839 (1992).
17. Phase Transition studies in two Liquid Crystal nO.m Homologous series.  
PB.Rao, **D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati.  
*Crystal Research and Technology*, V.p.829-839(1992).
- 18\*. Phase Transitions in Ferroelectric Liquid Crystal DOBAMBC by Density.  
**D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati.  
*Ferroelectrics*, V.**141**, p.287-296 (1993).
- 19 Density studies in Terephthalylidenen-Bis-p-n-Alkyl anilines, TBAnA(n=5 and 6).  
SL.Narayana, CR.Prabhu, **D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati.  
*Liquid Crystals*, V.**15**, p.909-914(1993).
20. Multiple Relaxation Phenomena in Low-frequency Dielectric investigations of Smectic Polymorphism.  
GP.Rani, **D.M.Potukuchi**, NVS.Rao and VGKM.Pisipati  
*Solid State Communications*, V.**88**,p.795-801(1994).
- 20.Dilatometric studies at Isotropic to Smectic-F transition in 10O.14.  
NVS.Rao, **D.M.Potukuchi**, G.P.Rani and VGKM.Pisipati.  
*Z.Naturforsch.A.*, V.**20**, p.177-181(1994).
21. Pre-Transitional Effects at Isotropic to Mesomorphic Phase Transitions  
Terephthalylidene –Bis-p-n-alkyl aniline, TBAA series.  
SL.Narayana, CR.Prabhu, **D.M.Potukuchi** and VGKM.Pisipati.  
*Liquid Crystals*, V.**20**, p.177-181(1996).
22. Low-frequency Dielectric investigations of Smectic-C Tilt Angle.  
G.P.Rani, **D.M.Potukuchi** and VGKM.Pisipati.  
*Molecular Crystals and Liquid Crystals*, V.**31**,p.169-180(1996).
23. Growth of Smectic-B and Phase Transitions in Liquid Crystalline PbnA(n=4, 5 and 6) Compounds.  
**D.M.Potukuchi**, SLNarayana, GP.Rani and VGKM.Pisipati.  
*Crystals Research and Technology*, V.**31**,p.683-689(1996).
24. Systematic Dilatometric studies across Isotropic to Smectic-F Transition.  
M.Srinivasulu, **D.M.Potukuchi** and VGKM.Pisipati.  
*Z.Naturforsch.A.*, V.**52a**, p.713-716(1997).

25. Weak Forces for the Growth of Smectic-F Liquid Crystal.  
**D.M.Potukuchi**, M.Srinivasulu, GP.Rani and VGMK.Pisipati.  
*Molecular Crystals and Liquid Crystals*, V.**319**, p.19-29(1998).
26. Frequency Shift in Smectic Multiple Relaxations and the Effect of Flexible end Chain Length.  
 GP.Rani, **D.M.Potukuchi**, and VGMK.Pisipati.  
*Liquid Crystals*, V.**25**,p.589-595(1998).
27. Sythesis and Characterisation of novel Ferroelectric Liquid Crystals derived from L-Tyrosine.  
 Poluri A.Kumar, **D.M.Potukuchi**, MLN Mohan and VGKM.Pisipati.  
*Molecular Crystals and Liquid Crystals*, V.**325**,p.127-135(1998).
- 28\* Sythesis studies of Pre-Transitional Effects at Isotropic to Smectic-F transitions in higher homologues of nO.m compounds.  
 M.Jitendranath, M.Srinivasulu, **D.M.Potukuchi**, G.S.Rama Rao and VGMK.Pisipati  
*Mol.Cryst.Lid.Cryst.*, V.**366**, p.457-471(2001)
29. Low-frequency Dielectric, Optical and Spontaneous Polarisation studies of a room temperature Ferro electric Liquid Crystals.  
 BVS Gaud, **D.M.Potukuchi**, and VGKM.Pisipati.  
*Ferroelectrics*, V.**265**, p.279-295(2002).
30. Ferro-electric Characterization of a Room Temperature Ferroelectric Liquid Crystal, 2C1.BAAP.18O-BBP by Low-frequency Dielectric and Optical methods.  
**D.M.Potukuchi**, BVS.Gaud and VGKM.Pisipati.  
*Ferroelectrics*, V. **289**, 77-96 (2003)
31. Low-frequency Dielectric Relaxation, Spontaneous Polarisation, Optical Tilt Angle and Response Time investigations in a Fluorinated Ferro-electric Liquid Crystal, N125F2(R\*)  
**D.M.Potukuchi**, AK.George, C.Carboni, S Al-Harthy and J.Naciri  
*Ferroelectrics*, **300**, 1-15(2004).
32. Pre-transitional effects and Dipole Dynamics at Isotropic-Nematic Liquid Crystal Transition by Low-frequency Dielectric studies.  
 Mariam Al-Hinai, AK.George, **DMPotukuchi**, AH. Al-Harthy and C.Carboni  
*Phase Transitions.*, **76(12)**, 1035-1043(2003)
- 33\*.Dielectric response in the Smectic-A and Smectic-C\* phases of a Ferroelectric Liquid Crystal, 12CN5(R\*).  
 AK George, M. Al-Hinai, C.Carboni and SH. Al-Harthy, DM Potukuchi and J.Naciri.  
*Molecular Crystals and Liquid Crystals*, **409**, 343-353(2002).
34. Influence of Hydrogen Bonding for the Phase Abundance in Ferroelectric Liquid Crystals.  
 B.Sridevi, PV.Chalapathi, M.Srinivasulu, VGKM.Pisipati and **D.M. Potukuchi**  
*Liquid Crystals*, **31**, 303-310(2004).
35. Mesomorphism in a binary mixture of non-mesogens: A Dielectric Spectroscopy investigation.  
 A.K.George, **D.M.Potukuchi**, S.H. Al-Harthy and C.Carboni.  
*Z.Naturforsch.*, **59a**, 1-6(2004).

36. On the Dissociation Energies of Silver Halide Molecules  
P.Sambasiva Rao, R.R.Reddy and **DM.Potukuchi**  
*Acta Ciencia Indica*, **XXXI P, No.2**, 225(2005).
37. Estimation of Dissociation Energy of NiC Molecule  
P.Sambasiva Rao, R.R.Reddy and **DM.Potukuchi**  
*Journal of Quantitative Spectroscopy and Radiative Transfer*, 98, 81-84 (2006).
38. Synthesis, characterization, spontaneous Polarization and Low-frequency Dielectric Relaxation studies in an Achiarl Banana Liquid Crystal, Bent-16.  
PV Chalapathi, M.Srinivasulu, BVS Gaud, VGKM Pisipati and **DM Potukuchi**  
*Ferroelectrics*, 322, 53-67(2005)
39. Influence of Oxygen atom in lower Homologues of Schiff-base compounds: A comparative study.  
N.Ajeetha, **DMPotukuchi** and VGKM.Pisipati  
*Phase Transitions*, **78**, 369(2006)
40. Alternating Inter-molecular Hydrogen Bonding in Linear Liquid Crystal Complexes..  
R.Suriyakala, G.Narayana Swamy, V.G.K.M.Pisipati and **D.M.Potukuchi**  
*Molecular Crystals and Liquid Crystals*, **457**, 181(2006)
41. Performance Evaluation of Incremental Training Method for Face Recognition Using PCA.  
Ch.Satyanarayana, **DM.Potukuchi** and L.Pratap Reddy  
*Journal for Real Time Image Processing*, **1**, no(4), 311-327(2007).
42. Synthesis and Characterization of Bent Liquid Crystal Phases by Microscopy, Calorimetry, Spontaneous Polarization and L-F. Dielectric Relaxation Studies in Bent-7.  
PV Chalapathi, VGKM Pisipati and **D.M. Potukuchi**  
*Ferroelectrics*, **361**, 45-64 (2007)
43. Tilt Angle, spontaneous Polarization and Low-Frequency Dielectric Relaxation investigations in chiral Nematic and Smetic-C\* phases of Hydrogen Bonded Ferroelectric Liquid Crystal (HBFLC) -11bpa.  
B.Sreedevi, P.V.chalapathi, VKM Kotikalapudi, G.K.M.pisipati and **D.M.Potukuchi**  
*Ferroelectrics*, **361**, 18-36 (2007)
44. Phase Transitions and Characterization in a Chiral Smectic-A<sub>deVries</sub> Liquid Crystal by Low-Frequency Dielectric Spectroscopy  
**D.M.Potukuchi** and A.K.George  
*Molecular Crystals and Liquid Crystals*, **487**, 92-109(2008)
45. Investigations of Phase Transitions and Characterization of N\* and C\* phases by study of Tilt Angle, Electroclinic Effect, Spontaneous Polarisation and Low Frequency Dielectric Relaxations in a Hydrogen Bonded Ferroelectric Liquid Crystal, HBFLC: 12bpa  
B.Sreedevi, P.V.Chalapathi, V.K.M.Kotikalapudi, <sup>a</sup>V.G.K.M.Pisipati and **D.M.Potukuchi**  
(communicated)
46. Crystallization Kinetics with Hexagonal Pre-Cursor Meso Phases  
S.Padmaja, N.Ajita, M.Srinivasulu, S.R.Girish, V.G.K.M.pisipati and **D.M.Potukuchi**  
(communicated)

48. Dielectric Parameters as Diagnostic Tool and Indicatrix for Disease – A Microwave Study.

V.Malleswar Rao, B.Prabhakar Rao and **D.M.Potukuchi**

*IETE Technical Review*, **25**, 91(2008)

49. Prediction of Late Potentials in ECG using Wavelet Coefficients

P.V.Rama Raju, Madhu Sudana Rao, PB.P.Rao and **D.M.Potukuchi**

*Gitam Journal of Information Communication Technology*, V. **1**, 111-115(2008).

49. Low-Frequency dielectric studies in chiral Nematic and Smectic-C\* phases of Hydrogen Bonded Ferroelectric Liquid Crystal, HBFLC, 9bpa.

**D.M.Potukuchi**, B.Sreedevi, P.V.chalapathi and V.G.K.M.pisipati. (commntd).

50\*.Evaluation of Un-supervised Training strategy on Middle Zone Component Recognition of Telugu Document Images.

A.C.Sastry, D.S.Murthy, **D.M.Potukuchi** and L.Pratap Reddy.

*National Confer. of Image Recognition and Reconstruction Techn.*, India, Aug.(2007)

51\*.Influence of Hydrogen Bonding on Device Parameters in an FLC(12bpa);

Investigations of Tilt Angle, Electroclinic Effect and Spontaneous Polarization.

V.K.M.Kotikalapudi and **D.M.Potukuchi**

*National Symposium on Condensed Matter Physics*, India, Nov.15-17(2007).

52\*.Identification of Ferroelectric Phases and their Characterization in an Achiral Bent Liquid Crystal(Bent-11) by Low-Frequency Dielectric Relaxations.

P.V.Chalapathi and **D.M.Potukuchi**

*National Symposium on Condensed Matter Physics*, India, Nov.15-17(2007).

53\*.LF Dielectric Relaxation Investigations in the Chiral Nematic and Smectic-C\* Phases of a Hydrogen Bonded Ferroelectric Liquid Crystal(HBFLC)-11BPA.

B.Sreedevi, P.V.Chalapathi and **D.M.Potukuchi**

*National Symposium on Condensed Matter Physics*, India, Nov.15-17(2007).

[\*denotes papers presented at International Conferences, National, Symposia and Seminars and published in international journals]

## CURRICULAR VITAE

M.Sc. degree in Solid State Physics, and Ph.D. from Nagarjuna University, India in 1989 for the thesis entitled "PHASE TRANSITIONS IN THERMOTROPIC LIQUID CRYSTALS". Experimental Research work with Prof. Pisipati for about 15 years involving various tenures, sponsored by UGC (URF), CSIRI(SRF & RA) and AICTE(Scientist-B). Presently working as Associate Professor in Jawaharlal Nehru Technological University, India. Liquid Crystals (LCs) are known as rare one- and two-dimensional crystals and materials for Electro-Optic Display Devices. Joined JNT Univ., as faculty member and continuing experimental research in Liquid Crystals.

**Fields of Work:** Experimental Soft Condensed Matter– Phase Transitions – Tricritical Points - Materials Science-Liquid Crystals, Supra-molecular Achiral and Chiral FE/AF LCs for devices.

**Experimental Methods:** Polarized Thermal Microscopy, Dilatometry, Differential Scanning Calorimetry, Ultrasonics, Birefringence, Low-Frequency Dielectric Relaxations, Collective Excitations – Ferroelectrics and Nonlinear Optics- Ferroelectric and Antiferroelectric LC phase characterization.

**Projects Handled:** Inter digitated Phases-DAE-BRNS-Co-Investigator .

**Applied Aspects of Research:** Involves indigenous synthesis of LCs exhibiting phases of device interest at ambient temperatures. Device transmission characteristics like Viewing Angle, Optical Bistability, Contrast Ratio and Response times were determined along with Optical Birefringence. Dipolar Relaxation Time, Activation Energy and influence of Applied Bias are studied in LC phases for their viability in display panels. Effect of Surface Stabilization techniques underlined by different chemical and mechanical means were studied. Mechanical response of LC phases is studied through Compressibility. Spontaneous Polarization and device parameters are determined in the chiral centre bearing FLCs in their tilted smectic-C\* phase (used in Optical Modulators and Switches).Low-frequency Dielectric Relaxation in Hydrogen Bonding Ferroelectric LCs. and Antiferroelectric and Ferroelectric Achiral Bent Liquid Crystals.

**Fundamental Aspects of Research:** Order LC Phase Transitions and Critical Fluctuations involving the 1-and 2-Dimensional Crystal growth studied for the nature of molecular forces, in Mean Field (or Critical Ising) approach. Critical indices of Order Parameter and Heat Capacity determined for Anisotropic Scaling hypothesis. Practicality of Nematic Field theories verified by Distribution Functions. Temperature variation of Order Parameters by Optics and Dielectrics revealed long range forces and Mean Field behaviour. Quasi-2-Dimensional Crystal Growth involving Harmonic Scaling theory in LC Smectic-F phase inferred the weak natured short range molecular forces. Supramolecular aspects of LCs and their influence on Ferroelectricity of LCs –Hydrogen Bonding in LCs – Antiferroelectric and Ferroelectric phases in Achiral Bent LCs-Multicritical Points Location on a Curved dielectric surface involving deVries phase-Bent Liquid Crystals of bow or v-shape and their Ferroelectricity and dielectric

relaxations in synclinal and anti-clinal states. Study of crystallization Kinetics at the interface involving Liquid Crystalline phase by scanning calorimetry- Application of Avrami equation for the mechanism of phase nucleation, propagation and stabilization.

**Theoretical Aspects of Research:** Construction of Potential energy curves for ground states of Diatomic molecules-RKR method and Calculation of Dissociation Energies-Franck-Condon Factors and r-Centroids for stable configurations in Diatomic molecules in ground state levels-Calcium halides, Silver halides etc.,

**Other Areas of Inter-disciplinary areas of Research Interest:** Medical Diagnostics-Microwave Instrumentation- Image Processing and Script Recognition, Script characteristic Recognition Techniques.

**Research Guidance:** Three Ph.D. Theses.

- Title – 1. “Spectroscopic Studies of Diatomic Molecules” –(awarded in 2004)  
2. “Synthesis, Characterization and Low-Frequency dielectric Investigations in Banana Liquid Crystals” –(awarded 2006)  
3. ”Influence of Hydrogen Bonding on Ferroelectric Liquid Crystals” –(awarded 2006)

**Publications: 50-Research Papers in International Journals**

Phase Transitions, Ferroelectrics, Solid State Communications, Molecular Crystals and Liquid Crystals, Liquid Crystals, Journal of Molecular Liquids, Crystal Research and Technology, Z.Naturforschung, Bulgarian Journal of Physics, Acta Ciencia Indica, Journal of Quantitative Spectroscopy and Radiation Transfer etc., Journal of Real time Image Processing etc.,

**Research Experience: 22 yrs.**

**Teaching Experience: UG:** B.Sc,-5Yrs, B.Tech-10 yrs: **PG:** M.Sc-4Yrs, M.Tech.-10yr.

**Research Referee:** Journal of Materials Research Bulletin.

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