

J.S.S. BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

Affiliated to Karnatak University, Dharwad

Accredited with 'A' Grade in last three cycles



Fourth Cycle NAAC Accreditation SELF STUDY REPORT (SSR)

CRITERION - III

3.5.1 (Q_nM)

Number of Collaborative activities for research,
Faculty exchange, Student exchange/ internship per year



Submitted to
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL, BENGALURU



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**Linkage with
KLE's Gudleppa Hallikeri Degree College, Haveri**



ಕೆ. ಎಲ್. ಇ. ಸಂಸ್ಥೆಯ

(O) : 08375-232475
Fax : 08375-236824
E-mail : principalghc@gmail.com
Website : www.kleghc.org

ಗುದ್ಲೆಪ್ಪ ಹಳ್ಳಿಕೇರಿ ಪದವಿ ಮಹಾವಿದ್ಯಾಲಯ,

ಹಾವೇರಿ-೫೮೧ ೧೧೦.

K. L. E. SOCIETY'S

GUDLEPPA HALLIKERI DEGREE COLLEGE,

HAVERI-581 110.

(Re-accredited by NAAC at "A" Grade with C.G.P.A. 3.23)

Ref. No. : _____

Date : 15-10-2018

INSTITUTIONAL ACADEMIC LINKAGE

DEPARTMENT OF PHYSICS, K.L.E. SOCIETY'S GUDLEPPA HALLIKERI DEGREE COLLEGE, HAVERI

AND

DEPARTMENT OF PHYSICS, J.S.S. BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

The objective of this Institutional Academic Linkage (IAL) is to encourage and facilitate the development of collaborative and mutually beneficial programmes which serve to enhance the intellectual life, academic development and cultural development among the student faculty members between the two institutions.

Thus, *Department of Physics, K.L.E. Society's Gudleppa Hallikeri Degree College, Haveri and Department of Physics, J.S.S. Banashankari Arts, Commerce and Shantikumar Gubbi Science College, Vidyagiri, Dharwad* have agreed that in support of their mutual interest in the field of education, research and extension activities:

The two institutions will;

- The exchange of information relating to their activities in teaching Field visits and research in fields of mutual interests.
- Promote appropriate joint research projects and joint courses of study.
- Endeavor to encourage students and staff for a formal exchange.
- Conduct short courses, Project works as mutually agreed in writing between the parties prior to commencement of this activity.



ಕೆ. ಎಲ್. ಇ. ಸಂಸ್ಥೆಯ

(O) : 08375-232475
Fax : 08375-236824
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Website : www.kleghc.org

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Date : 15-10-2018

-2-

The aim of the linkage to achieve a broad balance in the respective contributions and benefits of the collaboration and this shall be subject to periodic review by both the department.

The two departments agree to assist in the seeking of appropriate work space, library and technical facilities as appropriate.


In the implementation of specific cooperatives programs a written agreement covering all relevant aspects including funding and the obligations to be undertaken by each party will be negotiated, mutually agreed and formalized in writing, prior to the commencement of the program.

This agreement will take effect from the date of its signing and shall be valid for a period of *five years from 15th October, 2018 to 14th October, 2023 revoked by* mutual written agreement between the parties, and may be extended by mutual written agreement.

Either party may terminate the agreement at any time during the term by the provision of three months written notice to the party.

Signature's,


Principal
K.L.E. Society's
Gudleppa Hallikeri Degree College,
Haveri
PRINCIPAL
Gudleppa Hallikeri College,
HAVERI-581 110.


Principal
J.S.S. Banashankari Arts, Commerce and
Shantikumar Gubbi Science College,
Vidyagiri, Dharwad
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Shantikumar Gubbi Science College,
DHARWAD-580 004.



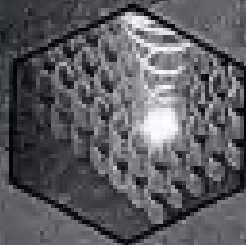
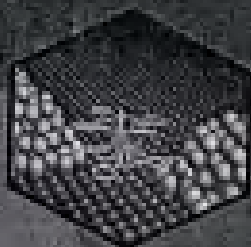
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Delhi 110042, India



Dr. P. K. Mishra
Shantikumar Gubbi Science College,
BANGALORE-560076

PP-53

Rotational Diffusion Of A Polar Solute In DMSO – Water System

Nagachandra K. H.^{1*}, M. S. Yaragop²

^{1*}*Department of Physics, JSS College, Dharwad 580004, Karnataka, India*

²*Department of Physics, G H College Haveri, Karnataka, India*

The rotational dynamics of a medium sized anion Sulfarhodamine B (SRB) has been studied in binary mixtures comprising of dimethyl sulphoxide and water at room temperature using both steady-state and time resolved fluorescence depolarization techniques. The fluorescence lifetimes of the molecule were measured using time correlated single photon counting technique employing ps laser as excitation source. The DMSO-water binary solvent mixture exhibits a non-ideal behavior, in that, it exhibits a peak value of viscosity 3.75 mPa s for a particular composition of DMSO, which is almost twice that of neat DMSO and four times that of neat water [1]. As such a nonlinear hook-type profile of rotational reorientation times of the probe (τ_r) as a function of viscosity (η) is observed in this binary system, with the rotational reorientation times being longer in organic solvent rich zone, compared to the corresponding isoviscous point in water rich zone. This is attributed to strong hydrogen bonding between the solute and DMSO molecules. The results have been discussed and analyzed in the light of hydrodynamic and dielectric friction models [2–4].

Keywords: Reorientation times; Hook type; Hydrogen bonding

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PP-54

Electron Scattering Cross-Sections for Pentane and Its Isomers

H. Tomer, N. Sinha, B. Antony*

Atomic and Molecular Physics Laboratory, Department of Physics, Indian Institute of Technology (Indian School of Mines), Dhanbad 826004, India

The aim of the present work is to calculate elastic and total scattering crosssections for pentane molecule and its isomers viz, Butane-2-methyl and Propane-2-2-dimethyl. The crosssections are calculated from ionization threshold of the molecule to 5 KeV energy range. Present cross-sections are calculated using the spherical complex optical potential (SCOP) formalism [1]. The calculated crosssections are useful in the simulation



J. S. Banashankari
PRINCIPAL
 J.S.S. Banashankari Arts, Commerce &
 Shantikumar Gubbi Science College,
 DHANBAD-580 004

Keywords: Ionization cross sections; Dissociation; Bethe analytical; Hard collision; Average energy

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PP-81

Raman and Infrared Spectra and Ab initio/DFT Calculations for the Optimized Structure of (S)-(+)-2-Nonyl isocyanate (C₁₀H₁₉NO)

M. S. Yaragop¹, ²Nagachandra K. H., ³G. B. Kalkoti, ³M. K. Aralakkanavar

¹Department of Physics, G. H. College Haveri, Karnataka, India

²Department of Physics, JSS College, Dharwad 580003, Karnataka, India

Raman and FT-IR spectral measurements of (S)-(+)-2-Nonyl isocyanate (C₁₀H₁₉NO) in the range 4000-100 cm⁻¹ have been recorded. Density functional theoretical computations at B3LYP/6-311++(d,p) basis set have been performed, yielding three conformers, optimized bond lengths and bond angles, harmonic vibration spectra and normal modes. The isocyanate moiety is bent by 6° from linearity. The C-H bond lengths in the methyl group are a little longer than the other C-H lengths. The IR and Raman spectra show sharp bands corresponding to CH, isocyanate and methyl modes. Out of two C-H stretching modes methyl group, one mode is very strong IR band at 2931cm⁻¹ and another is strong IR mode at 2856cm⁻¹. Raman strong modes are observed at 2928cm⁻¹ and 2882 cm⁻¹. Other CH modes near 1117, 1080, 1064cm⁻¹ are weak in IR and Raman. Since the molecule is chiral, rotational strengths vs wave number spectrum, equivalent of experimental vibrational circular dichroism (VCD) spectrum, computed at B3LYP/6-311++(d,p) shows a strong peak corresponding to the isocyanate's anti-symmetric mode, a property consistent with its strong absorption.

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J. Kalkoti
 PRINCIPAL
 J.S.S. Banashankari Arts, Commerce &
 Science College, Gubbi Science College,
 DHARWAD-580 004

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Solitons Explore The Quantum-Classical Boundary

PP-82

A. Sreedharan¹, S. Choudhury¹, R. Mukherjee^{1,2}, A. Streltsov³, S. Wüster^{1*}

¹Department of Physics, Indian Institute of Science Education and Research, Bhopal, Madhya Pradesh 462 066, India

²Department of Physics, Imperial College, London, UK

³SAP Deep Learning Center of Excellence and Machine Learning Research, SAP SE, Dietmar-Hopp-Allee 16, 69190 Walldorf, Germany

A soliton is a self-reinforcing wave packet that maintains its shape despite dispersion, and appears in a large number of natural nonlinear systems including Bose-Einstein Condensate (BEC). Solitons with a density maximum are referred to as bright solitons and those in BEC are composed of hundreds or thousands of identical atoms held together by their weak contact interactions. They behave very much like a compound object, with behaviour dictated by the non linear wave equation describing the mean field of their many body wave function. Soliton interactions [1] in BEC are strongly affected by condensate fragmentation dynamics [2], which we study using the Truncated Wigner Approximation and MCTDHB. Fragmentation occurs when the one body density matrix of the Bose gas acquires two eigenvalues of the order of the total number of particles and effectively becoming two condensates. We show that spatially separate solitons can mutually decohere prior to their collisions, a process tunable in experiments through ambient temperature. After decoherence collisions become classical, losing quantum features like phase dependence. However collisions can also re-establish coherence, leading to coupling of kinematics and coherence dynamics. Our investigations of soliton coherence allow us to reconcile seemingly contradictory experimental results regarding the role of phases in soliton collisions [3, 4]. Using three different quantum many body techniques we present a unified view on soliton fragmentation, phase diffusion and a quantum to classical transition in their collision dynamics.

Keywords: Soliton; Bose-Einstein condensate; Fragmentation; Decoherence; Phase diffusion

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