CURRICULUM VITAE

1. Name: Bidhan Chandra Bag

2. Mailing Address: Department of Chemistry,Visva-Bharati, Santiniketan -731 235, India
e-mail:bidhanchandra.bag@visva-bharati.ac.in
Phone number:6296326245

3. Designation: Associate Professor

4. Thesis Title :
"STUDIES OF SOME ASPECTS OF DISSIPATIVE NONLINEAR QUANTUM
SYSTEMS WITH SPECIAL REFERENCE TO CLASSICAL CHAOS"
Advisor :
Professor Deb Shankar Ray
Department of Physical Chemistry,
Theory Group,
Indian Association for the Cultivation of Science,
Jadavpur, Kolkata- 700 032
INDIA.

5. Research Interest:
Non Equilibrium Statistical Mechanics; Quantum Mechanics and allied subjects, Chaos,
Nonlinear Dynamics , Aggregation kinetics, Complex Net Work and Protein Folding
Kinetics

6. Research Scholars:

(a) Ph. D degree awarded

(i) Dr. Pradip Majee
(ii) Dr. Gurupada Goswami
(iii)Dr. Monoj Kumer Sen(iv) Dr. Alendu Baura
(iv) Dr. Alendu Baura
(v) Dr. Somrita Ray
(vi) Dr. Shrabani Mondal
(vii) Dr. Joydip Das

(b) Ph. D degree not awarded

(i) L. R. Rahul Biswas
(ii) Mousumi Biswas

7. PUBLICATIONS:

(1) Effectiveness of a plant polymer as an antioxidant

B. C. Bag , A. K. Ghosh, B. Adhikari and S. Maiti, Polymer Degradation and
Stability, 61, 303 (1998).

(2) A stochastic approach to chaotic diffusion

B. C. Bag, S. Chaudhuri and D. S. Ray, Indian J. Phys. B(invited review article), 72, 427 (1998).

(3) Statistical aspect of chaos: dissipative quantum systems

D. S. Ray and B. C. Bag, in Nonlinear Dynamics and Computational Physics(Narosa Publishers, New Delhi 1999).

(4) A semiclassical theory of quantum noise in open chaotic systems

B. C. Bag, S. Chaudhuri, J. Ray Chaudhuri and D. S. Ray, Physica D, 125, 47 (1999)

(5) A semiclassical theory of dissipative Henon-Heiles system

B. C. Bag and D. S. Ray, J. Stat Physics, 96, 271 (1999).

(6) Dissipative tunneling in presence of classical chaos in a mixed quantum-classical systems

B. C. Bag, B. C. Gupta and D. S. Ray, Phys. Lett. A, Phys. Lett. A. 255, . 65 (1999)

(7) A simple semiclassical approach to Kramers' problem

J. Ray Chaudhuri, B. C. Bag and D. S. Ray, J. Chem. Phys., 111, 10852 (1999).

(8) Quantum noise induced chaotic oscillations

B. C. Bag and D. S. Ray, Phys. Rev. E,

(9) Fluctuation-Dissipation relationship in chaotic dynamics

B. C. Bag and D. S. Ray, Phys. Rev. E , 62, 1927 (2000).

(10) Environment induced dynamical chaos

B. C. Bag and D. S. Ray, Phys. Rev. E , 62, 4409 (2000).

(11) Chaos and information entropy production

B. C. Bag, J. Ray Chaudhuri and D. S. Ray, J. Phys. A.: Math. Gen., 33, 8331 (2000)

(12) Fluctuations and existence of potentials in dissipative semi-classical systems

B. C. Bag and D. S. Ray, Euro Phys. J. B, 17, 115 (2000).

(13) Weak quantum noise limit of stochastic processes

D. S. Ray and B. C. Bag, Indian J. Theoretical Phys. (invited article) 48, No.4 (2000).

(14) Analytical and numerical investigation of escape rate for a noise driven bath

J. Ray Chaudhuri, S. K. Banik , B. C. Bag and D. S. Ray, Phys Rev. E., 63, 061111 (2001).

(15) Noise properties of stochastic processes and entropy production

B C. Bag , S. K. Banik and D. S. Ray, Phys. Rev. E, 64, 026110 (2001)

(16) Approach to quantum Kramer's equation and barrier crossing dynamics

D. Banerjee, B. C. Bag, S. K. Banik and D. S. Ray, Phys. Rev. E, 65, 021109 (2002)

(17) Upperbound of time derivative of entropy for non equilibrium stochastic processes
B. C. Bag. Phys. Rev. E, 65, 046118 (2002)

(18) Generalized quantum Fokker-Planck, diffusion and Smoluchowski equations with true probability distribution functions

S. K. Banik, B. C. Bag and D. S. Ray, Phys. Rev. E , 65, 051106 (2002)

(19) Non-equilibrium stochastic processes: Time dependence of entropy flux and entropy production

B. C. Bag, Phys. Rev. E, 66, 026122 (2002)

(20) Quantum Kramers' equation for energy diffusion and barrier crossing dynamics in the low friction regime

D. Banerjee, S. K. Banik, B. C. Bag and D. S. Ray, Phys. Rev. E, 66, 051105 (2002)

(21) Quantum Smoluchowski equation: Escape from a meta stable state

D. Banerjee, B. C. Bag, S. K. Banik and D. S Ray, Physica A(invited article), 318, 6 (2003).

(22) Colored non-Gaussian noise driven systems: Mean first passage time

B. C. Bag, Eur. Phys. J. B, 34, 115 (2003).

(23) Quantum Brownian motion and generalization of Arrhenius rate law

B. C. Bag, D. Banerjee, S. K. Banik and D. S Ray, J. Indian Chem. Soc. (invited article) , 80, 511 (2003).

(24) Information Entropy production in non-Markovian systems

B. C. Bag, J. Chem. Phys., 119, 4988 (2003)

(25) Numerical simulation of quantum transmission coefficient using c-number quantum Langevin equation

D. Barik, B. C. Bag and D. S. Ray, J. Chem. Phys., 119,12973 (2003)

(26) Upper bound of time derivative information entropy in non-Markovian systems

P. Majee and B. C. Bag Czech. J. Phys., 54, 389 (2004)

(27) Solution of quantum Langevin equation; approximation, theoretical and Numerical Aspects

D. Banerjee, B. C. Bag, S. K. Barik and D. S. Ray, J. Chem. Phys., 120, 8960 (2004)

(28) The effect of interference of additive colored and multiplicative white noises on the escape rate

P. Majee and B. C. Bag, J. Phys. A : Gen. Math., 37, 3352 (2004)

(29) Colored thermal noise driven dynamical systems: upper bound of time derivative of information entropy

G. Goswami, B. Mukherjee and B. C. Bag, J. Phys. A: Gen. Math. 38, 1659 (2005)

(30) Colored thermal noise driven dynamical system in presence in presence and absence of nonequilibrium constraint: time dependence of entropy flux and entropy production

G. Goswami, B. Mukherjee and B. C. Bag, Chem. Phys. 312, 47 (2005)

(31) Colored non-Gaussian noise induced resonant activation

P. Majee, G. Goswami and B. C. Bag, Chem. Phys. Lett. 416, 256 (2005)

(32) Quantum escape kinetics over a fluctuating barrier

P. K. Ghosh, D. Barik, B. C. Bag and D. S. Ray, J. Chem. Phys. 123, 224104 (2005)

(33) Escape through an unstable limit cycle: resonant activation

B. C. Bag and C. K. Hu, Phys. Rev. E 73, 061107 (2006)

(34) Role of colored cross correlation in additive and multiplicative white noises on upper bound of time derivative of information entropy

G. Goswami, P. Majee, D Barik and B. C. Bag, Acta Phys. Pol. B 37, 2433 (2006)

(35) Colored multiplicative and additive non-Gaussian noise driven dynamical system : Mean first passage time

G. Goswami, P. Majee and P. K. Ghosh and B. C. Bag, Physica A 374, 549 (2007)

(36) Role of phase difference and colored cross-correlation on current in multiplicative and additive noise driven systems

G. Goswami, P. Majee, P. K. Ghosh and B. C. Bag , Physica A 375, 249 (2007).

(37) Effects of barrier fluctuation on the tunneling dynamics in presence of classical chaos in a mixed quantum-classical system

A. Saha, B. C. Bag and P. Sarkar, Pramana J. Phys. 68, 377 (2007).

(38) Splitting of Kramers rate due to interference of stochastic resonances

P. K. Ghosh, B. C. Bag and D. S. Ray, Phys. Rev. E, 75 , 032101 (2007)

(39) Escape through an unstable limit cycle driven by multiplicative colored non-Gaussian and additive white Gaussian noises

B. C. Bag and C. K. Hu, Phys. Rev. E 75, 042101 (2007)

(40) Escape through a fluctuating energy barrier in the presence of non-Gaussian noise

G. Goswami, P. Majee and B. C. Bag, Fluctuation and Noise Letts., 7, L151 (2007).

(41) Noise correlation-induced splitting Kramers' escape rate from a metastable state

P. K. Ghosh, B. C. Bag and D. S. Ray, J. Chem. Phys. , 127, 044510 (2007)

(42) Influence of noises on the synchronization of the stochastic Kuramoto model

B. C. Bag, K.G. Petrosyan and Chin-Kun Hu, Phys. Rev. E, 76, 056210 (2007) (Selected in Virtual Journal of Biological Physics Research, Vol. 14, Issue 10, 2007)

(43) Colored cross-correlated noises driven dynamical systems: Time dependence of information entropy and its time derivative

G. Goswami, P. Majee and B. C. Bag, Int. J. Theo. Phys. 47, 1173 (2008).

(44) Kinetics of self-induced aggregation of Brownian particles: non-Markovian and non-Gaussian features

P. K. Ghosh, M. K. Sen and B. C. Bag, Phys. Rev. E, 78, 051103 (2008)

(45) Entropy evolution of a harmonic oscillator driven by broad-band noise

P. Majee, G. Goswami and B. C. Bag, J. Stat. Mech.: Theory and Experiment , P11015 (2008) .

(46) The effect of interference in additive and multiplicative white noises on information entropy production and entropy flux

M. K. Sen and B. C. Bag, Mod. Phys. Letts. B 23, 2385 (2009).

(47) Current Inversion Induced by Colored non-Gaussian Noise

B. C. Bag and C.-K. Hu, J. Stat. Mech.: Theory and Experiment , P02003 (2009).

(48) A unified description of time dependence of information entropy production and flux in thermal broad-band noise driven dynamical systems

P. Majee, G. Goswami, D. Barik and B. C. Bag, Int. J. Mod. Phys. B 23, 3789 (2009).

(49) Generalization of barrier crossing rate for colored non Gaussian noise driven open systems

M. K. Sen and B. C. Bag, Eur. Phys. J. B, 68, 253 (2009)

(50) Effect of anomalous diffusion on directed motion in a multiplicative noise driven flashing ratchet system

P. Majee, G. Goswami, M. K. Sen and B. C. Bag, Eur. Phys. J. B, 72, 435 (2009)

(51) Noise induced escape through an unstable limit cycle in the presence of fluctuating barrier

M. K. Sen, A. Baura and B. C. Bag, J. Stat. Mech.: Theory and Experiment , P 11004 (2009)

(52) Information dynamics of a particle in a magnetic field

A. Baura, M. K. Sen and B. C. Bag Eur. Phys. J. B, 75, 267 (2010) .

(53) Colored noise, folding rates and departure from Kramer's behaviour

B. C.Bag , C. K. Hu and M. S. Li , Phys. Chem. Chem. Phys. 12, 11753 – 11762 (2010).

(54) Effect of time delay on the onset of synchronization of the stochastic Kuramoto model

M. K. Sen, B. C. Bag , K. G. Petrosyan and C. K. Hu, J. Stat. Mech.: Theory and Experiment , P08018 (2010) .

(55) Magnetic-field-induced breakdown of equivalence of multidimensional motion

A. Baura, M. K. Sen and B. C. Bag, Phys. Rev. E 82, 041102 (2010).

(56) Quantum diffusion in a Fermionic bath

S. S. Sinha, D. Mondal, B. C. Bag and D. S. Ray, Phys. Rev. E 82, 051125 (2010).

(57) Non-Gaussian noise driven open systems: Generalization of Kramers theory with a unified approach

A. Baura, M. K. Sen, G. Goswami and B. C. Bag, J. Chem. Phys. 134, 044126 (2011).

(58) Study of thermodynamically inspired quantities for both thermal and external colored non Gaussian noises driven dynamical system

M. K. Sen, A. Baura and B. C. Bag, International Journal of Stochastic Anyalysis, doi:10.1155/2011/721352 (Invited article)doi:10.1155/2011/721352 (Invited article).

(59) Barrier crossing dynamics of a charge particle in presence of a magnetic field: A new turnover phenomenon

A. Baura, M. K. Sen and B. C. Bag, Phys. Chem. Chem. Phys. 13, 9445 (2011).

(60) Periodic force induced stabilization or destabilization of the denatured state of a protein

P. K. Ghosh, M. S. Li and B. C. Bag, J. Chem. Phys. 135, 114101 (2011).

(61) Work fluctuation theorem for colored noise driven open systems

M. K. Sen, A. Baura and B. C. Bag, Euro. Phys. J. B 83, 381 (2011)

(62) Upper limit of rate of information transmission for thermal and external colored non Gaussian noises driven dynamical systems

M. K. Sen, A. Baura and B. C. Bag, Int. J. Mod. Phys. B 26, 1250113 (2012)

(63) Lifetime of the incoherent state of coupled phase oscillations

S. Ray, M. K. Sen, A. Baura and B. C. Bag, Euro. Phys. J. B 85, 306 (2012)

(64) S. S. Sinha, A. Ghosh, D. S. Ray and B. C. Bag "Quantum Brownian Motion in Spin bath" in "Concepts and Methods in Modern Theoretical Chemistry : Statistical Mechanics" edited by S. K. Ghosh and P. K. Chattaraj (CRC Press, Taylor and Francis Group, 2013) .

(65) Effect of multiplicative noise on the self-induced aggregation kinetics of Brownian particles

M. K. Sen, S. Ray, A. Baura and B. C. Bag, Chem. Phys. Letts. 559, 117 (2013).

(66) Effect of non Markovian dynamics on Barrier crossing dynamics of a charged particle in presence of a magnetic field

A. Baura, M. K. Sen and B. C. Bag, Chem. Phys. 417, 30 (2013) .

(67) Study of Non-Markovian dynamics of a charged particle in presence of a magnetic field in a simple way

A. Baura, S. Ray, M. K. sen and B. C. Bag, J. Appl. Phys. 113, 124905 (2013)

(68) Tuning of barrier crossing time of a particle by time dependent magnetic field

A. Baura, S. Ray and B. C. Bag , J. Chem. Phys. 138, 244110 (2013); doi: 10.1063/1.4811363

(69) Synchronization of Nonidentical Coupled Phase Oscillators in the Presence of Time Delay and Noise

S. Ray, M. K. Sen, A. Baura, and B. C. Bag, Journal of Complex Systems
, 2013, Article ID 591513, 8 pages http://dx.doi.org/10.1155/2013/591513 (Invited Article)

(70) Magnetic field induced dynamical chaos

S. Ray, A. Baura, and B. C. Bag, Chaos 23, 043121 (2013); doi: 10.1063/1.4832175.

(71) Nonequilibrium entropic temperature and its lower bound for quantum stochastic processes

S. Ray, A. Baura, and B. C. Bag, Phys. Rev. E 89, 032148 (2014).

(72) Resonant activation in a colored multiplicative thermal noise driven closed system

S. Ray, D. Mondal, and B. C. Bag, J. Chem. Phys. 140, 204105 (2014)

(73) Shannon entropic temperature and its lower and upper bounds for non-Markovian stochastic dynamics

S. Ray, and B. C. Bag, Phys. Rev. E 90, 032103 (2014).

(74) Fluctuating magnetic field induced resonant activation

S. Mondal, S. Das, A. Baura, and B. C. Bag, J. Chem. Phys. 141, 224101 (2014)

(75) Resonance behavior of a charged particle in presence of a time dependent magneticfield

S. Ray, M. Rano, and B. C. Bag, J. Chem. Phys. 142, 154122 (2015)

(76) Effect of interference between two colored noises on the stationary states
of a Brownian particle

S. Mondal and B. C. Bag, Phys. Rev. E 91, 042145 (2015)

(77) Microscopic theory of heat transfer between two fermionic thermal baths
mediated by a spin system

S. Ray, and B. C. Bag, Phys. Rev. E 92, 052121 (2015).

(78) Kramers' turnover phenomenon in the spatial diffusion region

S. Mondal, B. C. Gupta and B. C. Bag, J. Stat. Mech. (2016) 013204

(79) Rate laws of the self-induced aggregation kinetics of Brownian particles

S. Mondal, M. K. Sen, A. Baura, B. C. Bag, Physica A 445 (2016) 128–137.

(80) The role of interplay between the potential and the ambient
energies on the vibration energy harvesting

S. Ray, S. Mondal, B. Mandal and B. C. Bag, Eur. Phys. J. B 89 (2016) 224.

(81) Fokker-Planck equation for the non-Markovian Brownian motion
in the presence of a magnetic field

J. Das, S. Mondal, and B. C. Bag, J. Chem. Phys. 147, 164102 (2017).

(82) A generic signature of a fluctuating magnetic field: An additional turnover prior to the
Kramers' one

S. Mondal, A. Baura, S. Das and B. C. Bag , Physica A 502, 58 (2018)

(83) Autonomous stochastic resonance driven by colored noise

S. Mondal, J. Das, B. C. Bag and F. Marchesoni, Phys. Rev. E 98, 012120 (2018)

(84) Bounds of the entropy production of the irreversible thermodynamics and its
relation with the non-equilibrium temperature

Joydip Das and Bidhan Chandra Bag, Physica A 520, 433 (2019)

(85) Unified approach to stochastic thermodynamics: Application to a quantum heat engine

Joydip Das, L. R. Rahul Biswas, and Bidhan Chandra Bag, (2020) Phys. Rev. E 102, 042138

(86) Comment on "Non-Markovian harmonic oscillator across a magnetic field and time-dependent force fields"

Joydip Das and Bidhan Chandra Bag, Phys. Rev. E 103, 046101 (2021)

(87) Dynamics of a driven damped particle in the presence of a magnetic field: Asymmetric splitting of the output signal

 L. R. Rahul Biswas, Joydip Das and Bidhan Chandra Bag, Pramana – J. Phys. 96, 191 (2022)

7. Invited Talk

1. Time evolution of phase space in non-Markovian stochastic processes : time dependence of information entropy production entropy flux
'Symposium on Theoretical Chemistry', Bhabha Atomic Research Center, Mumbai, India, pp-IT56 (2004)

2. Escape through a fluctuating energy barrier: Resonant activation
` 2006 NCTS spring workshop on critical phenomena and complex system' , Chinese Culture University (2006).

3. The role of non Markovian dynamics on the protein folding kinetics
` 2007 NCTS May workshop on critical phenomena and complex system' , Chinese Culture University (2007).

4. Theory of barrier crossing dynamics of a charge particle in presence of a magnetic field, National workshop on Quantum Perspective of Advanced Materials, Department of Physics, Vidyasagar Univrsity, East Midnapur, West Bengal, India (2011)

5. Statistical theory of the ionic reactions in presence of a magnetic field, National Level Seminar on Recent Trends in Research and Teaching in Chemical Sciences, Department of Chemistry, Panskura Banamali College, East Midnapur, West Bengal, India (2012)

6. Non linear dynamics of a charged particle in presence of a magnetic filed
Theoretical Physics Seminar Circuit, Institute of Physics, Bhubaneswar, India

7. New mechanism to account violation of Kramers' theory on protein folding kinetics
Current Trends in Biochemical and Biophysical Modelling (BBM 2013)
October 7-8, 2013, The S. N. Bose National Centre for Basic Sciences, Kolkata (invited Talk)

8. Effect of magnetic field on Barrier crossing dynamics of a charged particle
CONDENSED MATTER DAYS-2014 (CMDAYS14), Department of Physics and Center for research in Nano Science and Nano Technology, University of Kolkata.

9. Non equilibrium temperature and its bounds,
CONDENSED MATTER DAYS-2015 (CMDAYS15), Department of Physics ,
Visva-Bharati, santiniketan

10. Bounds of the entropy production of the irreversible thermodynamically and
its' relation with the non equilibrium temperature.
Electronic Structure, Spectroscopy and Dynamics, February 22-25, 2018 at Indian
Association for the Cultivation of Science (IACS), Kolkata

11 Unified approach to stochastic thermodynamics
"Current Trends in Theoretical Chemistry (CTTC-2020)", 23 rd -25 th September,
2021, via online mode organised by Chemistry Division, Bhabha Atomic
Research Centre, Mumbai in association with the Society for Materials Chemistry.

8. Manuscript submitted/under preparation:

1. An approach to derive the Fokker-Planck equation for the Non-Markovian dynamics of a
driven Brownian particle : Induced electric field from a time-independent magnetic field
Joydip Das, Mousumi Biswas, Debasish Mondal, and Bidhan Chandra Bag

2. Asymmetric splitting of a spectrum for the rate constant in the presences of an
electromagnetic field

L. R. Rahul Biswas, Shrabani Mondal and Bidhan Chandra Bag

3. Magnetic field-induced anomalous distribution of particles

Shrabani Mondal, L. R. Rahul Biswas, Mousumi Biswas, and Bidhan Chandra Bag

4. Mechanism of barrier crossing in the presence of a fluctuating magnetic field

Mousumi Biswas, Shrabani Mondal and Bidhan Chandra Bag

5. Unified description of the heat transfer between two thermal bats

L. R. Rahul Biswas, Mousumi Biswas, Shrabani Mondal and Bidhan Chandra Bag