SHORT CURRICULUM VITAE

1. Name: Bidhan Chandra Bag

2. Designation: Professor

3. **Specialisation** : Physical Chemistry

4. **Research Interest:**
Chaos, Barrier crossing dynamics, Aggregation kinetics, Protin folding kinetics, Synchronisation of phase oscillators, Stochastic Thermodynamics and restting

5. (a) Number of students who awarded Ph. D degree : 7

Important placement of Ph. D students:

(i) Dr. Somrita Ray
Assistant Professor, IISER Berhampur

(ii) Dr. Shrabani Mondal
Assistant Professor, Jadavpur University

(b) Number of students who not awarded Ph. D degree : 2

6. Present teaching areas:

(i) At UG level:

(a) Thermodynamics and chemical equilibrium with **eitght credits**

(b) Physical practical at B. Sc. Sem..-III with **two credits**

(ii) At PG level with physical special:

(a) Classical mechanic and Brownian motion with **4 credits**

(b) Formulation of mechanical wave and Electromagnetic wave, revisit of old quantum theory and formulation of matter wave with **4 credits.**

7. Publications: 90

(1) Impact of the memory of a Brownian particle on the resetting-induced steady state
S. Mondal, B. Mandal and B. C. Bag, Phys. Rev. E **112**, 024121 (2025)

(2) Magnetic field-induced anomalous distribution of particles
Shrabani Mondal , L. R. Rahul Biswas , Mousumi Biswas and Bidhan Chandra Bag, Eur. Phys. J. Plus **139,** 741 (2024) .

(3) Non-markovian dynamics-induced fictitious electric field
in the presence of a time-independent magnetic field
Joydip Das, Mousumi Biswas , Debasish Mondal and Bidhan Chandra Bag, Eur. Phys. J. B **97,**16 (2024).

(4) Dynamics of a driven damped particle in the presence of amagnetic field: Asymmetric splitting of the output signal
L. R. Rahul Biswas, Joydip Das and Bidhan Chandra Bag, Pramana – J. Phys.
96, 191 (2022) (88)

(5) 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)
(6) 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
(7) 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)
(8) Autonomous stochastic resonance driven by colored noise
S. Mondal, J. Das, B. C. Bag and F. Marchesoni, Phys. Rev. E **98**, 012120 (2018)
(9) 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)
(10) 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).
(11) 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** 224 (2016) .
(12) Rate laws of the self-induced aggregation kinetics of Brownian particles
S. Mondal, M. K. Sen, A. Baura, B. C. Bag, Physica A **445** 128 (2016).
(13) Kramers' turnover phenomenon in the spatial diffusion region
S. Mondal, B. C. Gupta and B. C. Bag, J. Stat. Mech. (2016) 013204
(14) 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).
(15) 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)
(16) 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)
(17) Fluctuating magnetic field induced resonant activation
S. Mondal, S. Das, A. Baura, and B. C. Bag, J. Chem. Phys. **141**, 224101 (2014)
(18) 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).
(19) 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)
(20) 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).
(21) Magnetic field induced dynamical chaos
S. Ray, A. Baura, and B. C. Bag, Chaos **23**, 043121 (2013); doi: 10.1063/1.4832175.
(22) 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)
(23) 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

(24) 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)
(25) 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) .
(26) 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).
(27) 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) .
(28) 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)
(29) 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)
(30) 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)
(31) 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).
(32) 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).
(33) 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).
(34) 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).
(35) Quantum diffusion in a Fermionic bath
S. S. Sinha, D. Mondal, B. C. Bag and D. S. Ray, Phys. Rev. E **82,** 051125 (2010).
(36) Magnetic-field-induced breakdown of equivalence of multidimensional
motion
A. Baura, M. K. Sen and B. C. Bag, Phys. Rev. E **82**, 041102 (2010).
(37) 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) .
(38) 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 (2010).
(39) 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) .
(40) 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)
(41) 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)

(42) 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)

(43) 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).
(44) Current Inversion Induced by Colored non-Gaussian Noise
B. C. Bag and C.-K. Hu, J. Stat. Mech.: Theory and Experiment , **P02003** (2009).
(45) 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).
(46) 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) .
(47) 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)
(48) 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).
(49) 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)
(50) 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)
(51) 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).
(52) 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)
(53) 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)
(54) 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).
(55) 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).
(56) 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)
(57) 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)
(58) Escape through an unstable limit cycle: resonant activation
B. C. Bag and C. K. Hu, Phys. Rev. E **73**, 061107 (2006)
(59) 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)
(60) Colored non-Gaussian noise induced resonant activation
P. Majee, G. Goswami and B. C. Bag, Chem. Phys. Lett. **416**, 256 (2005)

(61) 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)
(62) 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)
(63) 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)
(64) 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)
(65) Upper bound of time derivative information entropy in non-Markovian systems
P. Majee and B. C. Bag Czech. J. Phys., **54,** 389 (2004)
(66) 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)
(67) Information Entropy production in non-Markovian systems
B. C. Bag, J. Chem. Phys., **119**, 4988 (2003)
(68) 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).
(69) Colored non-Gaussian noise driven systems: Mean first passage time
B. C. Bag, Eur. Phys. J. B, **34**, 115 (2003).
(70) 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).
(71) 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)
(72) Non-equilibrium stochastic processes: Time dependence of entropy flux and entropy production
B. C. Bag, Phys. Rev. E, **66**, 026122 (2002)
(73) 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)
(74) Upperbound of time derivative of entropy for non equilibrium stochastic processes
B. C. Bag. Phys. Rev. E, **65**, 046118 (2002)
(75) 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)
(76) Noise properties of stochastic processes and entropy production
B C. Bag , S. K. Banik and D. S. Ray, Phys. Rev. E, **64,** 026110 (2001)
(77) 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).
(78) Fluctuations and existence of potentials in dissipative semi-classical systems
B. C. Bag and D. S. Ray, Euro Phys. J. B, **17**, 115 (2000).
(79) Chaos and information entropy production
B. C. Bag, J. Ray Chaudhuri and D. S. Ray, J. Phys. A.: Math. Gen., **33**, 8331 (2000)
(80) Weak quantum noise limit of stochastic processes
D. S. Ray and B. C. Bag, Indian J. Theoretical Phys. (invited article) **48**, No.4 (2000).
(81) Environment induced dynamical chaos
B. C. Bag and D. S. Ray, Phys. Rev. E , **62**, 4409 (2000).

(82) Fluctuation-Dissipation relationship in chaotic dynamics
B. C. Bag and D. S. Ray, Phys. Rev. E , **62**, 1927 (2000).
(83) Quantum noise induced chaotic oscillations
B. C. Bag and D. S. Ray, Phys. Rev. E, **61,** 3223 (2000).
(84) A simple semiclassical approach to Kramers' problem
J. Ray Chaudhuri, B. C. Bag and D. S. Ray, J. Chem. Phys., **111,** 10852 (1999).
(85) 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)
(86) A semiclassical theory of dissipative Henon-Heiles system
B. C. Bag and D. S. Ray, J. Stat Physics, **96**, 271 (1999).
(87) 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)
(88) 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).
(89) 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).
(90) 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).