

CURRICULUM VITAE

Name: Biswajit Ray
E-Mail: brphy@caluniv.ac.in
Present Position: Professor, Department of Physics
Nationality: Indian
Academic qualifications: M.Sc., Ph.D.

Membership of Learned Societies:

1. Indian Physics Association (Life member)
2. Laser and Spectroscopy Society of India (Life member)

Teaching:

Atomic and Molecular Physics, Quantum Electronics
Laser Physics, Electronics and Instrumentation

Research:

Laser Physics & Quantum Optics
Atomic and Molecular Spectroscopy

Research Projects (PI):

1. Investigation on cold atoms and molecules, UGC-UPE project; Amount: Rs. 50 lakhs;
Year: 2007-2013
2. High Resolution Diode Laser Spectroscopy of Atmospheric Molecules Funded by
DST, New Delhi, Amount- 28 lakhs; Year: 2007-2010

Ph. D. Students Supervising:

1. Amitava Bandhyopadhyay (Awarded in 2008)
2. Mabud Hossain (Awarded in 2012)
3. Priyanka Poddar (Awarded in 2014)
4. Soma Mitra (Awarded in 2014)
5. Mridula Jana (Awarded in 2014)
6. Saswati De (Awarded in 2018)
7. Sekhar Dey (Continuing)
8. Chandan Das (Continuing)

Talks Delivered/paper presented during the last 5 years:

1. Conference: National Conference on Atomic, Molecular and Nano Science (NCAMNS-2019), 3-4 April, 2019, held at Aliah University, NewTown; Topic: Magnetic field effect on the coherent absorption and transmission resonances in atomic vapour (Invited Talk).
2. Conference: Quantum optics & quantum technology; 5-8 June, 2017, held at Indian Association for the Cultivation of Science (IACS); Topic: Magnetic field effect on the quantum optical resonances in atomic vapour; (Invited Talk)
3. Conference: National seminar on recent trends in condensed matter physics including laser applications; March 8-9, 2017; held at University of Burdwan, Department of Physics; Topic: On line shape of electromagnetically induced transparency in a V-type system using 87Rb D1 and D2 lines (Paper Presented).
4. Conference: The central role of light in science and the importance of optical technologies; December 15-16, 2016; held at St. Pauls's College, Kolkata; Topic: Study of EIT in a V-type system using 87Rb D1 & D2 lines (Paper Presented)
5. Conference: National Seminar on condensed matter, laser and communication (NSCMLC 2015), February 27-28, 2015, Held at Department of Physics, University of Burdwan; Topic: A study of the nonlinear optical effects in a coherently driven atomic medium with buffer gas (Paper Presented)
6. Variable Energy Cyclotron Centre (VECC), Bidhan Nagar, Regular Physics Group Seminar; 15th December, 2015; Topic: Laser induced quantum coherent processes in atomic medium (Invited Talk)
7. Conference: Ultrafast Science-2015, S. N. Bose National Centre for Basic Sciences, Kolkata, India; Nov 19-21, 2015; Topic: Controlling the sign of the coherent resonance in atomic vapour (Paper Presented)

Research Publications:

Total research publications: 56

Some selected publications in international refereed research journal:

1. Diode Laser Spectroscopic Measurement and Impact Theoretical Calculation of Collisional Broadening of Acetylene n_1+n_3 Band Transitions , Co-Authors : B. K. Dutta et al; Euro. Phys.J. D 11 (2000) 99-108
2. Semi-classical analysis of Helium Broadened acetylene n_1+n_3 band Transitions by a NIR Diode Laser Spectrometer, Co-Authors: B. K . Dutta et al; Euro. Phys. J. D 13 (2001) 337-344
3. Temperature and power dependent measurements of RbD_2 transitions by Doppler limited and Doppler free spectroscopy; Co-Authors: B. K. Datta et al; Fizika A, 12 (2003)4, 171-182
4. Line shape study of water vapour by tunable diode laser spectrometer in the 822-832 nm wavelength region, Co-Authors: A. Ray et al; Applied Physics B, 79, (2004) 915-921
5. On line shape measurement and simulation of rovibrational transitions of water vapour in the near infrared region, Co-Authors: A. Bandhopadhyay et al; Chemical Physics Letters, 401, (2004) 135-139

6. Velocity selective resonance dips in the probe absorption spectra of Rb-D2 transitions induced by a pump laser, Co-Authors: S. Chakrabarti et al; Chemical Physics Letters, 399, (2004) 120-124
7. Line shape simulation and saturation absorption measurement of rubidium D2 transition, Co-Authors: D. Bhattacharya et al; Chem. Phys. Lett. 389 (2004) 113-118
8. Line shape study of Ar-broadened water vapour overtone band transitions in the 818- 834 nm wavelength region, Co-Authors: A. Bandhopadhyay et al; J. Mol. Spectrosc., 234 (2005) 93-98
9. Velocity selective optical Pumping effects and electromagnetically induced transparency for D2 transitions in rubidium, Co-Authors: S. Chakraborty et al; J. Phys. B, 38 (2005) 4321-4327
10. "Theoretical study of electromagnetically induced transparency in a five-level atom and application to Doppler broadened and Doppler free Rb atoms" by D. Bhattacharyya, B. Ray; P N. Ghosh, Journal of Physics B: Atomic, Molecular and Optical Physics, 40, (2007) 4061
11. "Laser frequency stabilization for atom cooling and magnetic field compression of the trap" by S. Chakrabarti, A. Ray, A. Bandyopadhyay, D. Bhattacharyya, B. Ray, B. N. Jagatap, K. G. Monohar, P. N. Ghosh, Laser Physics, 17(9), 1(2007).
12. Velocity dependent Pump-Probe spectroscopy for a five level system-An application to RbD2 system, D. Bhattacharya, A. Bandyopadhyay, S. Chakrabarti, B. Ray, P. N. Ghosh, Chem. Phys. Lett., 440 (2007) 24-30
13. Velocity selective optical pumping and repumping effects with counter and co- propagating laser radiations for D2 lines of rubidium, S. Chakrabarty, B. Ray, P. N. Ghosh, Euro. Phys. J. D , 42 (2007) 359-368
14. Diode laser spectroscopic measurements and theoretical calculations of line parameters of nitrogen broadened water vapour overtone transitions in the 818-834 nm wavelength region, A. Bandhopadhyay, B. Ray, P. N. Ghosh, D. L. Niles, R. R. Gamache; J. Mol. Spectrosc., 242 (2007) 10-16
15. A simple scanning diode laser source and its application in wavelength modulation spectroscopy around 825 nm, A. Ray, A. Bandyopadhyay, B. Ray, S. De, P.N. Ghosh, Optics and Laser Technology, 39 (2007) 359-367
16. Population Loss in Closed Optical Transitions of Rb and Cs Atoms Confined in Micrometric Thin Cells; V. Biancalana, S. Cartaleva, Y. Dancheva, P.N. Gosh, E. Mariotti, S. Mitra, L. Moi, N. Petrov, B. Ray, D. Sarkisyan, D. Slavov; ACTA PHYSICA POLONICA A, Vol. 116 (2009), 495-497
17. High contrast electromagnetically induced transparency in a nitrogen filled Rb vapour cell, M.M. Hossain, S. Mitra,, P.N. Ghosh; B. Ray; Laser Physics (Non Linear and Quantum Optics), 2009, Vol. 19, No. 10, pp. 2008–2013.
18. Study of width and height of EIT resonance in a Doppler broadened five-level system with varying probe power, M.M. Hossain, S. Mitra, S. Chakrabarti, D. Bhattacharyya, P.N. Ghosh; B. Ray; Euro. Phys J. D 53 (2009) 141-146
19. Measurement and analysis of rotational lines in the (2m1 + m2 + m3) overtone band of H2O perturbed by CO2 using near infrared diode laser spectroscopy, Priyanka Poddar, Amitava Bandyopadhyay, Debasish Biswas, , P. N. Ghosh; B. Ray; Chem. Phys. Lett. 469 (2009) 52–56
20. Dissociation of OCS by 150 keV Ar+ ion impact; M. R. Jana, B. Ray, P. N. Ghosh and C. P. Safvan, J. Phys. B: At. Mol. Opt. Phys. 43 (2010) 215207

21. Diode laser spectroscopy of He, N₂ and air broadened water vapour transitions belonging to the (2v₁+v₂+v₃) overtone band; Priyanka Poddar, Soma Mitra, Md. Mabud Hossain, Debasish Biswas, Pradip N. Ghosh, B. Ray; *Molecular Physics* 108 (2010) 1957-1964.
22. On line shape of electromagnetically induced transparency in a multilevel system; S. Mitra, M.M. Hossain, P.N. Ghosh, S. Cartaleva, D. Slavov, B. Ray; *Optics Communications* 283 (2010) 1500–1509
23. Non-linear resonances caused by coherent, optical pumping and saturating effects in presence of three laser fields for 85Rb-D₂ transition” M.M. Hossain, S. Mitra, P. Poddar, C. Chaudhuri, B. Ray, P.N. Ghosh ; *J. Phys. B : At. Mol. Opt. Phys.* 44, (2011) 115501 (1-12)
24. Standing wave pump field induced coherent non-linear resonances in rubidium vapor; S. Mitra, M.M. Hossain, P. Poddar, C. Chaudhuri, B. Ray, P.N. Ghosh; *Chem. Phys. Lett.* 513, (2011) 173-178
25. A comparative study of the effects of different buffer gases on the line shape of water vapour rovibronic transition, P. Poddar, S. Mitra, M.M. Hossain, B. Ray; *Vib. Spectrosc.* 56 (2011) 96-98.
26. Double EIT and enhanced EIT signal in a combination of Λ - and V-type system of Rb-D₂ transition” M. M. Hossain, S. Mitra, B. Ray, P. N. Ghosh; *Appl. Phys. B*, 103, (2011) 117-122
27. Spectroscopic study of self and buffer gasbroadenedCO₂ overtone transitions at 780 nm by NIR diode laser spectrometer; P. Poddar and B. Ray; *Euro. Phys. J. D.* 66 (2012) 228
28. Temperature and magnetic field effects on the coherent and saturating resonances in Λ - and V-type systems for the 85Rb-D₂ transition; S. Mitra, S. Dey, M. M. Hossain, P.N. Ghosh and B. Ray; *J. Phys. B: At. Mol. Opt. Phys.*; 46 (2013) 075002 (1-12)
29. Observation and theoretical simulation of electromagnetically induced transparency and enhanced velocity selective optical pumping in cesium vapour in a micrometric thickness optical cell; A. Krasteva, B. Ray, D. Slavov, P. Todorov, P. N. Ghosh, S.Mitra, S. Carteleva; *J. Phys. B: At. Mol. Opt. Phys.*, 2014
30. Dissociation of OCS by high energy highly charged ion impact, M.R. Jana, P.N.Ghosh, B. Ray, B. Bapat, R. K. Kushawaha, K. Saha, I. A. Prajapati, C.P. Safvan; *Euro.Phys. J. D.*; 2014
31. EIT line shape in an open and partially closed multilevel V-type system; S. Dey et.al.; *Optik* 126, (2015) 2711-2717
32. Investigation of high-contrast velocity selective optical pumping resonance at the cycling transition of Cs using fluorescence technique; S. Dey et al; *Opt. Comm.* 356, (2015) 378-388
33. A study of the repumping laser and external magnetic field effect on coherent absorption resonance in alkali vapour; S. Dey, et al, *Chem. Phys. Lett.* 627, (2015) 107- 115
34. Investigation of quantum coherence effects in a multilevel atom induced by three laser fields; S. Dey et al, *Eur. Phy. J. D* 69, (2015) 43 (1-11)
35. A detailed study of the quantum coherent and saturating resonances using the hyperfine lines of rubidium by S. Dey et al, *Hyperfine Interactions* volume 240, Article number: 56 (2019)