Dr. SUKHMANDER SINGH

Assistant Professor
Department of Physics
Central University of Rajasthan
NH-8, Bandar Sindri, Dist-Ajmer
Rajasthan-305817
Webpage:https://sites.google.com/site/sukhplasma/

Email: sukhmandersingh@curaj.ac.in
sukhmander.jnu@gmail.com
Phone: +91-9711600210

EDUCATIONAL QUALIFICATIONS

- **Ph.D.** in Plasma Physics from Department of Physics, **IIT Delhi**.
- **M.Sc.** in Physics from School of Physical Sciences, **J.N.U**.
- **B. Sc.** from Maharaja Ganga Singh University of Bikaner, Bikaner, India
- **Senior Secondary** from S.G.N. Khalsa Sr. Sec. School Sriganganagar, RBSE
- **Secondary** from Govt. Sec. School 20 GG, Sriganganagar, RBSE

ACADEMIC ACHIEVEMENTS

- Qualified Junior Research Fellowship (**JRF-NET**) by Council of Scientific and Industrial Research Dec. 2008.
- Qualified Joint Entrance Screening Test (**JEST**) in 2007.
- Qualified Graduate Aptitude Test (**GATE**) 2007.

Technical Skills:

FORTRAN, MATLAB , MATHEMATICA, COMSOL MULTIPHYSICS

TEACHING EXPERIENCE

[1] Assistant professor at Department of physics, Central University of Rajasthan, Ajmer, from Dec. 2015 onwards.

Paper taught: Optics and Modern Physics, Nuclear and Particle physics, quantum mechanics, classical electrodynamics, Mechanics, Mathematical Physics.

[2] Assistant Professor at Motilal Nehru College, University of Delhi from Feb. 2012 to Dec.2015.

Professional activities: Editorial member of IOSR Journal of Applied Physics (IOSR-JAP)

Reviewers of Journals

1. Physics of Plasma
2. Journal of Physics D: Applied Physics
3. International Journal of Ambient Energy

Membership of professional bodies

Life member of Indian Association of Physics Teachers **(11594 - L7588)**

Life Member of Plasma Science Society of India **(LM-1349)**

Life Member of Indian Science Congress Association (**L33892)**

RESEARCH INTERESTS

Area of interest includes, theory and simulation of plasma waves and instabilities in magnetized and dusty plasma, quantum plasma, Terahertz waves, Hall magnetohydrodynamics, , Generations of high power microwave, high altitude electromagnetic pulse, Direct energy weapons, modeling of magnetic field profiles for a Hall Thruster, Computational modelling of laser-plasma interactions.

LIST OF PUBLICATIONS:

[1] Jasvendra Tyagi, **Sukhmander Singh**, Hitendra K. Malik, Effect of dust on tilted electrostatic resistive instability in a Hall thruster. Journal of Theoretical and Applied Physics, 2018.

[2] **Sukhmander Singh**, Dispersion equation for electrostatic ion cyclotron instability under the effect of ionization in a dusty plasma. AIP Conference Proceedings 1953, 140149 (2018).

[3] Nidhi Pathak, Sukhdeep Kaur, and **Sukhmander Singh**, Study of self-focusing of Non Gaussian laser beam in a plasma with density variation using moment theory approach. Citation: AIP Conference Proceedings 1953, 060017 (2018).

[4] O.P. Malik, **Sukhmander Singh**, Hitendra K. Malik, A. Kumar. Low and high frequency instabilities in an explosion- generated-plasma and possibility of wave triplet . **Journal of Theoretical and Applied Physics (2015) Vol. 9 Pgs.75 -80**.

[5] O.P. Malik, **Sukhmander Singh**, Hitendra K. Malik, A. Kumar. High frequency instabilities in an explosion-generated-relativistic-plasma. **Journal of Theoretical and Applied Physics (**2015) Vol. 9, Pgs.105-110**.**

[6] H.K. Malik and **S. Singh**. Resistive instability in a Hall plasma discharge under ionization effect. **Physics of Plasmas (2013) Vol. 20, Pgs. 052115 (1-8).**

[7] **S. Singh**, H. K. Malik and Y. Nishida. High frequency electromagnetic resistive instability in a Hall thruster under the effect of ionization**. Physics of Plasmas (2013) Vol. 20, Pgs. 102109 (1-7).**

[8] **S. Singh** and H. K. Malik. Role of ionization and electron drift velocity profile to Rayleigh instability in a Hall thruster plasma: cutoff frequency of oscillations. **Journal of Applied Physics (2012) Vol. 112, Pgs. 013307(1-7).**

[9] H.K. Malik and **S. Singh**. Conditions and growth rate of Rayleigh instability in a Hall thruster under the effect of ion temperature. **Physical Review E (2011) Vol. 83, Pgs. 036406 (1-8).**

[10] **S. Singh** and H.K. Malik. Growth of low frequency electrostatic and electromagnetic instabilities in a Hall thruster. **IEEE Transactions on Plasma Science (2011) Vol. 39, Pgs. 1910-1918.**

[11] **S. Singh** and H.K. Malik. Resistive instabilities in a Hall thruster under the presence of collisions and thermal motion of electrons. **The Open Plasma Physics Journal (2011) Vol. 4, Pgs. 16-23.**

[12] T. Mohanty, **S. Dhounsi**, P. Kumar, A. Tripathi, D. Kanjilal. 250 keV Ar^{2+} ion beam induced grain growth in Tin oxide thin films. **Surface & Coatings Technology (Elsevier) (2009) 203, Pgs. 2410-2414.**

[13] O.P. Malik, S. Singh, H. K. Malik and A. Kumar. Electron Inertia Effect on High Power Electromagnetic Radiation Generated from Explosive and High Frequency Instabilities,

International Conference on Recent Trends in Electronics Communication and VLSI, 28-30, September 26, 2013, ASET, Faridabad, India.

[14] S. Singh, O.P. Malik and H. K. Malik. High Frequency Instability in an Explosive generated Relativistic Plasma, National Seminar on Applications of Basic Sciences in Engineering and Technology (NSABSET-2013) Pages.(14-16) December 27 -28, 2013, ECHELON Institute of Technology, Faridabad, India. **ISBN: 978-93-82880-96-7**.

[15] S. Singh, O.P. Malik, H. K. Malik. and A. Kumar. High power microwave and high altitude electromagnetic pulse sources and their application, pages (10-13). National Conference on Advancement in VLSI, Embedded and Communication, August, 2014, Al- Falah University, Faridabad, India

[16] O.P. Malik, M. K. Rana, S. Singh, and H. K. Malik. Investigation of High Altitude Electromagnetic Pulse Propagation under Relativistic Effect of Electrons. National Seminar on Applications of Basic Sciences in Engineering and Technology (NSABSET-2013) Pages (85-87) December 27 -28, 2013 ECHELON Institute of Technology, Faridabad, India. **ISBN: 978-93-82880-96-7**

[17] J. Tyagi, S. Singh and H K. Malik. Contribution of dust grains to Rayleigh–Taylor instability in a Hall Thruster (Pages- 252-255). National Conference on Advancement in VLSI, Embedded and Communication, August, 2014, Al- Falah University, Faridabad, India.

[18] O.P. Malik, S. Singh, H. K. Malik. and A. Kumar. effect of Dust particulates on High - Frequency Instability generated in an Explosive. National Conference on Advancement in VLSI, Embedded and Communication, August, 2014, Al- Falah University, Faridabad, India.

[19] Density Gradients Instability in a Hall Discharge Plasmas. Sukhmander Singh. International conference on High Power Coherent Radiation Generation & its Interaction with Matter. Samrat Ashok Technological Institute,Vidisha (M.P.) February 12-14, 2016.

[20] Review on Direct Thermal Energy Converter: Magnetohydrodynamics Power Generator". S. Singh, R. Malik and H. K. Malik. National Conference on Electrical Energy: Safety and Conservation" EESC proceeding of Delhi University, New Delhi, India. Pgs. 17-18, Jan 22 - 23, 2016. **ISBN : 978-93-82825-51-7**

[21] Derivation of Dispersion Equation under Dust Charge Fluctuation in a Hall Thruster. R. Malik, J. Tyagi, S. Singh and H. K. Malik. National Conference on Electrical Energy: Safety and Conservation" EESC proceeding of Delhi University, New Delhi, India. Pgs. 29-30,Jan 22 - 23, 2016. **ISBN : 978-93-82825-51-7**

Workshop/ school attended:

[1] Attended 3 weeks SERB school on High Intensity Laser plasma Interaction :Theory and Simulation at IIT Delhi, organized by prof V K Tripathi (May 5-23, 2014) .

[2] Attended in a workshop for the Paper Science and Life, organized by Delhi university on June 21-22 (2013).

[3] Attended the UGC 105th orientation programme conducted by the UGC HRDC, Rajasthan University, Jaipur on 4-30 Dec. 2017.

Conferences attended/ presentations:

1. 2nd International Conference on Condensed Matter & Applied Physics Engineering College, Bikaner. Karni Industrial Area, Pugal Road, Bikaner (Rajasthan) India on November 24-25, 2017.
2. S. Singh. Future Space Technology: Hall Effect Thruster. IISF-2015: Young Scientists' Meet 2015, (Paper code 31: Design & Manufacturing Technologies for 'Make In India') at IIT Delhi, New Delhi, December 04-08, 2015.
3. S. Singh. Stability Analysis of Electric Propulsion Engine. IISF-2015: Young Scientists' Meet 2015, (Paper code: 77. Indigenous Science & Technology) at IIT Delhi, New Delhi. December 04- 08, 2015.
4. S Singh, R Malik, J Tyagi and H K Malik. Two Dimensional Analyses for Plasma Acceleration Process in a Hall Thrusters. 30th National Symposium on Plasma Science & Technology, PLASMA December 1-4, 2015

5. J Tyagi, S Singh and H K. Malik. Rayleigh–Taylor instability in a Hall Thruster. National Conference on Advancement in VLSI, Embedded and Communication , August, 2014, Al-Falah University, Faridabad, India.
6. O.P. Malik, S. Singh, H. K. Malik. and A. Kumar. High Frequency Instability generated in an Explosive plasma. National Conference on Advancement in VLSI, Embedded and Communication, August, 2014, Al- Falah University, Faridabad, India.
7. J. Tyagi, S. Singh and H. K. Malik . Growth Rate of Rayleigh Taylor Instability in a Hall Thruster Dusty Plasma. International Conference on Research Trends in Interdisciplinary Sciences : Opportunities and Challenges (RTISOC-2014) Feb. 28 - March 1, 2014, M. M. College, Modinagar-201204 (U. P.) India.
8. O.P. Malik, S. Singh, H. K. Malik and A. Kumar. Dust Contribution to Excitation of High - Frequency Instability generated in an Explosive. International Conference on Research Trends in Interdisciplinary Sciences : Opportunities and Challenges (RTISOC-2014) Feb. 28 - March 1, 2014, M. M. College, Modinagar-201204 (U. P.) India.
9. S. Singh, J. Tyagi and H. K. Malik and R. P. Dahiya. Effect of Dust Particulates on Rayleigh -Taylor Instability in a Hall Thruster Plasma, 7th International Conferences on the Physics of Dusty Plasmas (ICPDP- 2014), Page 88, March 3-7 , 2014, New Delhi, India.
10. S. Singh, O.P. Malik, H. K. Malik. and A. Kumar. High power microwave and high altitude electromagnetic pulse. National Conference on Advancement in VLSI, Embedded and Communication, August, 2014, Al- Falah University, Faridabad, India.
11. S. Singh and H.K. Malik. Effects of magnetic field gradient on plasma plume in al Hall thruster. Laser Driven Charged Particle Acceleration and Applications, Indian Institute of Technology Delhi, India (April 5 - 7, 2013).
12. S. Singh, O.P. Malik and H. K. Malik, High Frequency Instability in an Explosive generated Relativistic Plasma, National Seminar on Applications of Basic Sciences in Engineering and Technology, December 27 -28, 2013, ECHELON Institute of Technology, Faridabad, India.
13. S. Singh and H.K. Malik. Effect of Magnetic Field and Density Profiles on Plasma Plume of a Hall Thruster. National Conference on Physics of Engineering Materials, at Deenbandhu Chhotu Ram University of Science and Technology (DCRUST), Murthal, Sonepat, Haryana (15-17 March 2013).

14. S. Singh and H. K. Malik. Conditions and Growth Rate of Rayleigh Instability in a Hall Thruster under the Effect of Ionization. 53rd Annual Meeting of the American Physical Society-Division of Plasma Physics, Salt Lake City, Utah, USA (Nov. 14 - 18, 2011) 210.
15. S. Singh and H.K. Malik. Study of Resistive Instability in a Hall Thruster. 52nd Annual Meeting of the American Physical Society-Division of Plasma Physics, Chicago, Illinois, USA (Nov. 8 – 12, 2010)
16. S. Singh and H.K. Malik, "Rayleigh Instability in a Hall Thruster: Effect of Ion Temperature and Magnetized Field" 52nd Annual Meeting of the American Physical Society-Division of Plasma Physics, Chicago, Illinois, USA (Nov. 8 – 12, 2010) 124.
17. S. Singh and H.K. Malik. "Rayleigh Instability in a Hall Thruster: Effect of Ion Temperature" 24th National Symposium on Plasma Science and Technology (PLASMA-2009), Hamirpur, India.

M.Sc. Theses Supervision

[1] Streaming instabilities in magnetized quantum dusty plasmas, Vinay Kumar, 2016MSPH010 in May 2018

[2] Generation of Terahertz Radiation in a Magnetised Hot Plasma is submitted by Jayanta Kumar Bera (2015MSBPH008) May 2018.

[3] Terahertz radiation generation by beating of two spatial-Gaussion laser in the presence of a Static magnetic Field by suman saini (2015IMSBPH020) in May 2018.

[4] THz radiation generation by mixing of two lasers in plasma having density ripple by arpan bairagi 2015IMSBPH001 in May 2018.

[5] Nonlocal Magnetorotational Instability by Yasha Sharm (2015MSPH023) in May 2017

[6] Bifurcations of nonlinear ion acoustic travelling waves in the frame of a Zakharov-Kuznetsov equation in magnetized plasma with a kappa distributed electron by Gourav Rana (2015MSPH006) in May 2017

[7] Gradient Driven Electromagnetic Instabilities in Hall Thruster Plasma by Khushbu Nagar (2015MSPH012) in 2017

[8] Quantum hydrodynamic model for Quantum Dusty Plasma- under the effect of ionization rate by Baleshwar Mahto (2015MSPH003) in 2017

[9] Charge Fluctuation on current driven electrostatic ion cyclotron instability in a magnetized plasma by Pooja Ahrodia (2015msph017) in 2017

[10] Bifurcations of dust ion acoustic travelling waves in a magnetized dusty plasma with a q-nonextensive electron velocity distribution by Jyoti Sheshma (2015MSPH009) in 2017

[11] Magnetic Field and Density Gradient Instability in a Hall Thruster by Pushpa Sharma (2014MSPH016) in 2016.

[12] Numerical Investigations of Sheath Instabilities in a Hall Thruster by Devendra Kumar Singaria (2014MSPH007) in 2016.

Research Project

Numerical Modeling for the Stabilization of Plasma in a Hall Thruster. UGC start up grants 2016 (Rs. 10 lacs).