



## Faculty Details proforma for DU Web-site

Title	Dr.	First Name	Jyoti	Last Name	Rajput	Photograph
Designation	Assistant Professor					
Address	Department of Physics and Astrophysics, University of Delhi, Delhi – 110007.					
Phone No Office	+91 - 11 - 27667725					
Email	jrajput@physics.du.ac.in , jrajput.du@gmail.com					
Educational Qualifications						
Degree	Institution				Year	
Ph.D.	Ph.D. (Physics: Dissociation Dynamics of Diatomic Molecules), Inter-University Accelerator Centre, New Delhi, (Affiliation to Jawaharlal Nehru University, New Delhi)				2007	
PG	M.Sc.(Physics), H.N.B. Garhwal University, Srinagar, Garhwal, India				1999	
UG	B.Sc.(PCM), H.N.B. Garhwal University, Srinagar, Garhwal, India				1997	
Career Profile						
<p>January, 2010 – till date: Assistant Professor, Department of Physics and Astrophysics, University of Delhi, New Delhi.</p> <p>August,2014 – August,2016: Research Associate at J. R. Macdonald Laboratory, Kansas State University, Manhattan, KS, USA (on leave from University of Delhi)</p> <p>December, 2009: Research Assistant, Inter-University Accelerator Centre, New Delhi.</p> <p>October, 2007 – November, 2009: Post Doctoral Fellow, Aarhus University, Aarhus, Denmark.</p> <p>February, 2002 – September, 2007: Research Fellow (funded by Council of Scientific and Industrial Research, India), Inter-University Accelerator Centre, New Delhi.</p> <p>July, 1999 – January, 2002: Post Graduate Teacher (Physics), Dehradun, Uttarakhand.</p>						
Administrative Assignments						
<p>Member : Executive Council of Department of Physics and Astrophysics (2010-2011)</p> <p>Member: Examination Committee of Department of Physics and Astrophysics (2011-2014)</p> <p>Member: Departmental Research Committee (2016-2018)</p>						

Member: Time-Table Committee (2018- )  
Member: Anti-ragging committee (2018- )  
Member: NAAC documentation committee  
Member: Committee for drafting and revision of M.Sc. syllabus

Nodal Officer for Admissions (2019-2020)

#### Areas of Interest / Specialization

##### Atomic and Molecular Physics (Experimental)

Addressing molecular physics, experimentally, for gaining deeper understanding of the subject. Studying dissociation dynamics, lifetimes, spectroscopy, photo-absorption properties, potential energy surfaces etc, of molecules and molecular ions using experimental techniques implementing ion-molecule and ion-photon collision setup.

Experience in studying dissociation dynamics using Recoil Ion Momentum Spectrometer in ion-molecule collision experiments.

Experience in design and implementation of an electrostatic deceleration lens for highly charged ions.

Experience in studying photo-absorption properties of biologically relevant chromophore molecules using an electrostatic storage ring (ELISA) and nano second lasers in an ion-photon collision setup.

On hands experience in handling vacuum systems, Ion Sources (ECR ion source, Electrospray Ion Source, Plasma Ion Source, Sputter Ion Source), Multihit Data Acquisition, Channel electron multipliers, Micro-Channel Plate detector, Photo-multiplier Tube, Optical Monochromator, Electrostatic Storage Ring (ELISA), Lasers (ns).

Experience in working with ion-optics simulation software "SIMION" , mechanical engineer's modeling software "SOLIDWORKS", the data analysis software "ROOT", the quantum chemical computation program GAMESS and Gaussian.

Experience in imaging the dissociation and ionization of molecular ions by ultrashort intense laser pulses.

#### Subjects Taught

1. M.Tech. (Nuclear Science and Tech.), Semester – I : “Quantum Mechanics and Electrodynamics”
2. M.Tech. (Nuclear Science and Tech.): “Experimental Nuclear Physics Laboratory – I”
3. M.Tech. (Nuclear Science and Tech.): “Experimental Nuclear Physics Laboratory – II”
4. M.Sc. (Physics), Semester – II : “Atomic and Molecular Physics” (Core)
5. M. Sc. (Physics), Semester – II : “Quantum Mechanics – II” (Core)
6. M.Sc. (Physics), Semester – VI : “Laser and Spectroscopy - II”
7. M.Sc. (Physics), Semester – VI : “Laser and Spectroscopy Lab”

## Research Guidance

1. Dissertation thesis guidance (Part of M.Sc. - IV Semester) :  
January to May, 2011: 1  
January to May, 2012: 2  
January to May, 2018: 1
2. Research Guidance:  
*One Research Assistant under DST project: Ms. Shruti Gupta (Nov. 2013 – Oct.2014)*  
*Research scholar with PhD degree awarded: 1 ( Mr. Herendra Kumar )*  
*Research scholar registered for PhD: 2 (Mr. Jatin Yadav and Ms. Pooja Kumari)*

## Publications Profile

### **Research papers published in Refereed/Peer Reviewed Journals**

Herendra Kumar, Pragya Bhatt, C. P. Safvan, and **Jyoti Rajput** **2018**. Three-body dissociation of  $\text{OCS}^{3+}$ : Separating sequential and concerted pathways. *J. Chem. Phys.* 148:64302

**Jyoti Rajput**, T. Severt, Ben Berry, Bethany Jochim, Peyman Feizollah, Balram Kaderiya, M. Zohrabi, U. Ablikim, Farzaneh Ziaee, Kanaka Raju P., D. Rolles, A. Rudenko, K. D. Carnes, B. D. Esry, and I. Ben-Itzhak **2018**. Native Frames: Disentangling Sequential from Concerted Three-Body Fragmentation. *Phys. Rev. Lett.* 120: 103001.

Bethany Jochim , Reid Erdwien, Y Malakar, T Severt, Ben Berry, Peyman Feizollah, **Jyoti Rajput**, B Kaderiya, W L Pearson, K D Carnes, A Rudenko and I Ben-Itzhak **2017**. Three-dimensional momentum imaging of dissociation in flight of metastable molecules. *New Journal of Physics.* 19:103006

B. Gaire, A. Gatton, F. Wiegandt, J. Neff, C. Janke, S. Zeller, D. Reedy, J. Rajput, I. Ben-Itzhak, A. L. Landers, A. Belkacem and Th. Weber **2016**. Bond Rearrangement and ionization mechanisms in the photo-double-ionization of simple hydrocarbons ( $\text{C}_2\text{H}_4$ ,  $\text{C}_2\text{H}_3\text{F}$ , and  $1,1\text{-C}_2\text{H}_2\text{F}_2$ ) near and above threshold. *Phys. Rev. A.* 94:033412

Ajit Kumar, **J Rajput**, T. Sairam, M. R. Jana, Lekha Nair and C P Safvan. **2014**. Setup for measuring angular anisotropies in slow ion-molecule collisions. *International Journal of Mass Spectrometry.* 374: 44.

Anastasia V. Bochenkova, Benedikte Klaerke, Dennis B Rahbek, **Jyoti Rajput**, Yoni Toker, Lars H Andersen **2014**. UV excited-state photoresponse of Biochromophore negative ions. *Angewandte Chemie.* 53: 9797.

**Rajput Jyoti** and Safvan C P. **2014**. Orientation and alignment effects in ion induced fragmentation of water: A triple coincidence study. *J. Chem. Phys.* 141:164313

P M Mishra, **J Rajput**, C P Safvan, S Vig and U Kadhane. **2014**. Velocity dependence of fragmentation yields in proton-naphthalene collision and comparison with electronic energy loss calculation. *J. Phys. B.* 47:085202

P M Mishra, **J Rajput**, C P Safvan, S Vig and U Kadhane. **2013**. Electron emission and electron transfer processes in proton-naphthalene collisions at intermediate velocities. *Phys. Rev. A*. 88:052707

Y Toker, D B Rahbek, H V Kiefer, **J Rajput**, R Antoine, P Dugourd, S Brøndsted Nielsen, A V Bochenkova and L H Andersen. **2013**. Photoresponse of the protonated Schiff base retinal chromophore in the gas phase. *Phys. Chem. Chem. Phys.* 15: 19566

G Aravind, B Klærke, **Jyoti Rajput**, Y. Toker, L. H. Andersen, A. V. Bochenkova, R. Antoine, J. Lemoine, A. Racaud and P. Dugourd. **2012**. Photodissociation pathways and lifetimes of protonated peptides and their dimers. *J. Chem. Phys.* 136:014307

**Rajput Jyoti** and Safvan C P. **2011**. Fragmentation of water by ion impact: Kinetic energy release spectra. *Phys. Rev. A*. 84:052704

**Rajput Jyoti** and Safvan C P. **2011**. Atomic and Molecular Rydbergs from water. *J. Chem. Phys.* 134:201101

O. Aviv, Y. Toker, **Jyoti Rajput**, D. Strasser, O. Heber, D. Schwalm, D. Zajfman, and L. H. Andersen. 2010. Search for dimmer emission from photoexcited  $(Al_4)^+$  *Phys. Rev. A*. 82:035201

Rajput, Jyoti, A Roy, D Kanjilal, R Ahuja and C P Safvan. 2010. An electrostatic deceleration lens for highly charged ions. *Review of Scientific Instruments*. 81: 043301.

Aravind G, **Rajput Jyoti**, D B Rahbek, B Klærke, T Balle and L H Andersen. 2010. Sub-microsecond photodissociation pathways of gas phase Adenosine 5'-Monophosphate Nucleotide ions. *Phys. Chem. Chem. Phys.* 12: 3486.

**Rajput Jyoti**, Dennis B Rahbek, Lars H Andersen, Amiram Hirshfeld, Mordechai Sheves, Piero Altoè, Giorgio Orlandi and Marco Garavelli. 2010. Probing and Modeling the Absorption of Retinal Protein Chromophores in Vacuo. *Angewandte Chemie*. 49: 1790.

Lincke Kasper, Theis Sølling, Lars H Andersen, Benedikte Klærke, Dennis B Rahbek, **Jyoti Rajput**, Christian Berg Oehlenschläger, Michael Åxman Petersen and Mogens Brøndsted Nielsen. 2010. On the absorption of the phenolate chromophore in the Green Fluorescent Protein – Role of individual interactions. *Chemical Communications*. 46: 734.

**Rajput Jyoti**, D B Rahbek, G Aravind and L H Andersen. 2010. Spectral tuning of Photoactive Yellow Protein chromophore by H-bonding. *Biophysical Journal*. 98: 488.

**Rajput Jyoti**, D B Rahbek, L H Andersen, T Rocha-Rinza, O Christiansen, K B Bravaya, A V Erokhin, A V Bochenkova, K M Solntsev, J Dong, J Kowalik, L M Tolbert, M Åxman Petersen and M Brøndsted Nielsen. 2009. Photoabsorption Studies of neutral Green Fluorescent Protein model chromophores *in vacuo*. *Phys. Chem. Chem. Phys.* 11: 9996.

Rocha-Rinza, Tomas, Ove Christiansen, **Jyoti Rajput**, Aravind Gopalan, Dennis B Rahbek, Lars H Andersen, Anastasia V Bochenkova, Alexander A Granovsky, Ksenia B Bravaya, Alexander V Nemukhin, Kasper Lincke Christiansen and Mogens Brøndsted Nielsen. 2009. Gas phase absorption studies of PYP

chromophore derivatives. *J. Phys. Chem. A.* 113: 9442.

Lammich, Lutz, **Jyoti Rajput** and Lars H Andersen. 2008. Photodissociation dynamics of gas-phase PYP chromophores. *Phys. Rev. E.* 78: 051916.

**Rajput Jyoti**, Lutz Lammich and Lars H Andersen. 2008. Measured lifetime of SF<sub>6</sub><sup>-</sup>. *Phys. Rev. Lett.* 100: 153001.

De, Sankar, A Roy, **Jyoti Rajput**, P N Ghosh and C P Safvan. 2008. Dissociation of Methanol by Ion Impact: Breakup dynamics, bond rearrangement and kinetic energy release. *International Journal of Mass Spectrometry.* 276: 43.

De, Sankar, **Jyoti Rajput**, A Roy, P N Ghosh and C P Safvan. 2008. Ion-induced dissociation dynamics of Acetylene. *Phys. Rev. A.* 77: 022708.

**Rajput Jyoti** and C P Safvan. 2008. Projectile charge state dependence of methane fragmentation. *Phys. Rev. A.* 77: 014702.

De, Sankar, **Jyoti Rajput**, A Roy, P N Ghosh and C P Safvan. 2007. Butterfly structure: Signature of vibrational flopping in dissociative acetylene. *J. Chem. Phys.* 127: 051101.

**Rajput Jyoti** and C P Safvan. 2007. Kinetic energy distributions in ion induced CO fragmentation: Signature of shallow states in multiply charged CO. *Phys. Rev. A.* 75: 062709.

De, Sankar, **Jyoti Rajput**, A Roy, P N Ghosh and C P Safvan. 2006. Formation of H<sub>3</sub><sup>+</sup> due to intramolecular bond rearrangement in doubly charged methanol. *Phys. Rev. Lett.* 97: 213201.

**Rajput Jyoti**, Sankar De, A Roy and C P Safvan. 2006. Kinetic energy distributions and signature of target excitation in N<sub>2</sub> fragmentation on collisions with Ar<sup>9+</sup> ions. *Phys. Rev. A.* 74: 032701.

#### **Research papers published in Refereed/Peer Reviewed Conferences**

**Jyoti Rajput** and C P Safvan. 2012. Energetic Rydberg neutrals from water dissociation. In proceedings of "XXVII International Conference on Photonic, Electronic and Atomic Collisions" held at Queen's University, Belfast, UK from 27<sup>th</sup> July to 2<sup>nd</sup> August 2011. *Journal of Physics: Conference Series.* 388: 012039.

De, Sankar, **Jyoti Rajput**, A Roy, R Ahuja, P N Ghosh and C P Safvan. 2007. Dissociation of Methanol and Acetylene by slow Highly Charged Ion Collisions. In proceedings of "7<sup>th</sup> Asian Conference on Atomic and Molecular Physics" held at Indian Institute of Technology, Madras, Chennai, India in December 2006. *Journal of Physics: Conference Series.* 80: 012005.

Conference Organization/ Presentations (in the last three years)

**Participation as Poster Presenter**

Rajput, Jyoti **2017**. Presented **four** posters at the “International Conference on Photonic, Electronic and Atomic Collisions” held from 26<sup>th</sup> July to 1<sup>st</sup> August 2017 at Queensland, Australia.

Rajput, Jyoti **2016**. Two- and three- body fragmentation of  $\text{CO}_2^+$  induced by intense ultrashort laser pulses. Presented at the 47<sup>th</sup> Annual meeting of American Physical Society, Division of Atomic Molecular and Optical Physics held from 23<sup>rd</sup> to 27<sup>th</sup> May 2016 at Providence, Rhode Island, USA

Rajput, Jyoti **2015**. Multiphoton dissociative ionization of  $\text{CS}^+$ . Presented at the 46<sup>th</sup> Annual meeting of American Physical Society, Division of Atomic Molecular and Optical Physics held from 8<sup>th</sup> to 12<sup>th</sup> June 2015 at Columbus, Ohio, USA

#### Research Projects (Major Grants/Research Collaboration)

1. “Slow Highly Charged Ion Molecule Collisions” under the Indo-French Centre for promotion of Advanced Research (Dec. 2012 to Dec. 2015, status: completed)
2. “Study of dissociation dynamics of small hydrocarbons” under SERC Fast Track Scheme for Young Scientists (status: completed)
3. “Exploring.....ion molecule collisions” under CRG Scheme of SERB (status: ongoing)

#### Awards and Distinctions

Awarded ‘Research Fellowship’ and eligibility for ‘Lecturership’ in ‘National Eligibility Test (NET)’, December, 2001, conducted jointly by Council of Scientific and Industrial Research (CSIR) and University Grants Commission (UGC), Government of India.

Eligibility for ‘Shyama Prasad Mukherjee Fellowship’, July 2002, awarded by Council of Scientific and Industrial Research (CSIR), Government of India.

Qualified ‘Graduate Aptitude Test in Engineering (GATE)’, March 2002, conducted by Department of Education, Government of India.

#### Association With Professional Bodies

##### **Memberships**

Life Member, Indian Society for Atomic and Molecular Physics (ISAMP).

#### Other Activities

##### **Invited Talks (last 5 years)**

1. “Photoabsorption studies on gas phase biological chromophores” at “XXII National Conference on Atomic and Molecular Physics (NCAMP 2019)” held at IIT, Kanpur from 25<sup>th</sup> to 28<sup>th</sup> March **2019**.
2. “Three body dissociation of molecular ions: separating sequential and concerted pathways” at Asian International Seminar on Atomic and Molecular Physics held at IIT, Mumbai and TIFR, Mumbai from 3<sup>rd</sup> to 8<sup>th</sup> December **2018**.
3. “Addressing molecular physics with lasers and ion beams” at a Seminar on “Recent

advances in atomic physics” held at Deen Dayal Upadhyay College, University of Delhi on 19<sup>th</sup> September **2017**.

4. “Three body-fragmentation of molecules: A novel representation to separate sequential and prompt mechanisms” at 21st National Conference on Atomic and Molecular Physics held at Physical Research Laboratory, Ahmedabad, India from 03/01/2017 to 06/01/2017.
5. “Sequential three-body breakup of CO<sub>2</sub><sup>+</sup> beam” at the 47<sup>th</sup> Annual meeting of American Physical Society, Division of Atomic Molecular and Optical Physics held from 23<sup>rd</sup> to 27<sup>th</sup> May **2016** at Providence, Rhode Island, USA
6. “Exploring sequential mechanism in three body fragmentation” as an AMO seminar at Department of Physics, Kansas State University, Manhattan, KS, USA on 6<sup>th</sup> April **2016**.
7. “Orientation and Alignment effects in ion-induced fragmentation of water molecules” as an AMO seminar at Department of Physics, Kansas State University, Manhattan, KS, USA on 17<sup>th</sup> September **2014**.

Signature of Faculty Member