

## RESUME

### **Dr. Ashish Kumar**

Assistant Professor  
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### **Objective:**

To make a remarkable impact in my work field with utmost sincerity and thus add value to the organization.

### **Educational Qualifications**

2011-2016	<b>Ph. D</b> from School of Basics Sciences, Indian Institute of Technology Mandi, in the field of Theoretical/Computational atomic physics under the guidance of Dr. Hari Varma and Prof. P. C. Deshmukh.
2009	Qualified in <i>GATE-2009, 2010, 2011.</i>
2005-2007	<b>M.Sc. Physics</b> , University of Rajasthan, Jaipur.
2002-2005	<b>B.Sc. Physics</b> , M.D.U. Rohtak.
2000-2002	<b>12<sup>th</sup></b> , H.B.S.E. Bhiwani.
2000	<b>10<sup>th</sup></b> , H.B.S.E. Bhiwani.

### SUMMARY OF THE RESEARCH WORK

I am involved in the calculation of photoionization parameters such as photoelectron cross-section, angular distribution asymmetry parameters etc. using several relativistic many body theories which include electron correlations in different ways.

I have studied the photoionization of free and confined atoms using RRPA which includes both correlation and relativistic effects. The effect of confinement has been modeled in our work by a spherical annular attractive shell potential. Confinement causes additional oscillations in the photoionization parameters due to the back-scattering of the escaping photoelectrons.

Furthermore, a combined effect of relativistic interaction and confinement manifests as oscillations in the angular distribution asymmetry parameter. Also, we found that the quadrupole effects are enhanced due to confinement in the case of Ca@C<sub>60</sub>.

With the upsurge of attosecond physics, it has become possible to measure the photoemission time delay between different subshells of atom by a technique called attosecond streaking. I am interested in theoretical investigation of time delay using sophisticated many-body theories. Quantum many-body theory, especially relativistic random phase approximation (RRPA) and relativistic multichannel quantum defect theory (RMQDT) methodology etc. are employed to calculate the time delay in photoemission process.

### **Publications in journals:**

**1. Ashish Kumar**, H. R. Varma, G. B. Pradhan, P. C. Deshmukh and S. T. Manson, Photoionization of Ca 4s in a spherical attractive well potential: Dipole, quadrupole and relativistic effects, *J. Phys. B: At. Mol. Opt. Phys.* **47**, 185003 (2014).

**2. Ashish Kumar**, Hari R. Varma, P. C. Deshmukh and S. T. Manson, Effect of confinement and interchannel coupling on High-Z atoms, *Journal of Physics: Conference Series* **488**, 022042 (2014).

**3. Ashish Kumar**, H. R. Varma, P. C. Deshmukh, S. T. Manson, V. K. Dolmatov and A. S. Kheifets, Effect of coulomb confinement resonances on time delay in  $\text{Ne}@C_{60}^{-5}$ , *Journal of Physics: Conference Series* **635**, 092042 (2015).

**4. Ashish Kumar**, H. R. Varma, P. C. Deshmukh, S. T. Manson, V. K. Dolmatov and A. S. Kheifets, Wigner photoemission time delay from endohedral anions, *Phy. Rev. A* **94**, 043401 (2016).

**5. Ashish Kumar**, H. R. Varma, P. C. Deshmukh, S. T. Manson, V. K. Dolmatov and A. S. Kheifets, Generalized Fano Expression for the Wigner-Eisenbud time delay in autoionization resonances: The  $2s \rightarrow np$  resonances in atomic Ne as a case study, *Phy. Rev. A* 2017 (to be submitted).

**6. Ashish Kumar**, H. R. Varma, P. C. Deshmukh, S. T. Manson, V. K. Dolmatov and A. S. Kheifets, Photoionization study of  $\text{Ar}@C_{60}@C_{240}@C_{540}$ : A time delay study, *Phy. Rev. A* (to be submitted).

### **Book/Book chapters**

**Ashish Kumar**, Sindhu Kalyadan, H. R. Varma and P. C. Deshmukh; **Quadrupole effects in the low energy photoionization of the 3s subshell of  $\text{Mg}@C_{60}$** . *Electron Collision Processes in Atomic and Molecular Physics*, (New Delhi: Narosa Publications), ISBN 978-81-8487-343-6, Page no.-168-171(2014).

### **Presentation in Conferences:**

#### **Oral:**

**1. Ashish Kumar**, Hari R. Varma and P. C. Deshmukh; DST-SERC School on Physics of Highly charged ions; TIFR Mumbai, February 10- 3 March 2013.

2. **Ashish Kumar**, Hari R. Varma and P. C. Deshmukh; VII In-House Symposium, Atomic and Molecular Physics Group, IIT Madras 18<sup>th</sup> March, 2014.

3. **Ashish Kumar**, Hari R. Varma and P. C. Deshmukh; Anushandhan, IIT Mandi Research Fair, 19<sup>th</sup> June, 2014.

4. **Ashish Kumar**, Hari R. Varma and P. C. Deshmukh; VIII In-House Symposium, Atomic and Molecular Physics Group, IIT Mandi 13<sup>th</sup> March, 2015.

### Poster:

1. Jobin Jose, Sindhu Kannur, **Ashish Kumar**, Hari R. Varma, P. C. Deshmukh and S. T. Manson. **Time delay in photoionization near Cooper minimum**, 43<sup>rd</sup> Annual Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP 2012) of the American Physical Society held at Anaheim, California, USA, June 4-8, 2012.

2. **Ashish Kumar**, Sindhu Kannur, Hari R. Varma, and P. C. Deshmukh. **Time Delay Study on Xe@C<sub>60</sub>**; DAE-BRNS Symposium on Atomic, Molecular and Optical Physics IISER Kolkata, 14-17 December 2012.

3. Sindhu Kalyadan, **Ashish Kumar**, H. R. Varma, John Costello and P. C. Deshmukh. **Autoionization Resonances in the 6.Xnm Spectral Range**; DAE-BRNS Symposium on Atomic, Molecular and Optical Physics IISER Kolkata, 14-17 December 2012.

4. **Ashish Kumar**, Sindhu Kannur, Hari R. Varma, and P. C. Deshmukh. **Quadrupole effects in the low energy photoionization of the 3s subshell of Mg@C<sub>60</sub>**; NCEAMP-Gujarat, 7-9 March 2013.

5. **Ashish Kumar**, Sindhu Kannur, Hari R. Varma, P. C. Deshmukh and S. T. Manson. **Photoionization studies of Cd@C<sub>60</sub>**, 44<sup>th</sup> Annual Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP 2013) of the American Physical Society held at Canada, June 3-7, 2013.

6. Ankur Mandal, Soumyajit Saha, P. C. Deshmukh, **Ashish Kumar**, Jobin Jose, S. T. Manson, **Time delay in photoionization of Xenon: Relativistic effect**, 44<sup>th</sup> Annual Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP 2013) of the American Physical Society held at Canada, June 3-7, 2013.

7. Sindhu Kalyadan, **Ashish Kumar**, H. R. Varma, John Costello and P. C. Deshmukh. **Autoionization Resonances in Lanthanide ions in the 6.Xnm Spectral Range**; 44<sup>th</sup> Annual Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP 2013) of the American Physical Society held at Canada, June 3-7, 2013.

8. **Ashish Kumar**, Hari R. Varma and P. C. Deshmukh; Anushandhan, IIT Mandi Research Fair, 24<sup>th</sup> June, 2013.

9. **Ashish Kumar**, Hari R. Varma, P. C. Deshmukh and S. T. Manson, **Effect of confinement and interchannel coupling on High-Z atoms**, XXVIII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC-2013), China, July 24-30, 2013.

**10. Ashish Kumar**, Tanu Priya, Hari R. Varma, P. C. Deshmukh, **Photoionization studies of Ne@C<sub>60</sub><sup>-5</sup>**, 20<sup>th</sup> National Conference on Atomic and Molecular Physics (NCAMP-XX), IIST Thiruvananthapuram, December 9-12, 2014.

**11. Ashish Kumar**, H. R. Varma, P. C. Deshmukh, S. T. Manson, V. K. Dolmatov and A. S. Kheifets, **Effect of coulomb confinement resonances on time delay in Ne@C<sub>60</sub><sup>-5</sup>**, XXIX International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC-2015), Spain, July 22-28, 2015.

### **Experience:**

- Assistant Professor of Physics in Central University of Haryana, Mahendergarh, Haryana, India-123031 from Feb 27, 2017 to present.
- Assistant professor in R.P.S P.G. College, Balana (Mahendergarh) Haryana from 12 Aug 2016 to 27 Feb 2017.
- Teaching assistant of several courses and physics labs in IIT Mandi (Jan. 2011-June 2016).

### **Technical Skills:**

- Quantum many-body theory, especially Dirac Hartree Fock (DHF), relativistic random phase approximation (RRPA) and relativistic multichannel quantum defect theory (RMQDT).
- Electronic structure and spectra of quantum confined systems.
- Programming Languages: FORTRAN and C.
- Operating Systems: Linux/Unix, Windows.
- Gaussian (Software), GAMESS (US), Origin 8.0, Computational Physics.

### **Referees:**

1· Dr. P. C. Deshmukh,  
Professor,  
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2· Dr. H. R. Varma,  
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3. Dr. S. T. Manson,  
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### **PERSONAL DETAILS**

Permanent Address : VPO-Neerpur  
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Father's Name : Ujjen Pal

Nationality : Indian

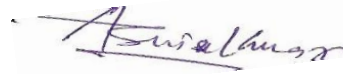
Age & Date of Birth : 31, 08-08-1985

Sex : Male

Languages Known : English, Hindi

Religion & Community : Hindu and Yadav

I hereby declare that the above statements are true of my knowledge.



**Ashish Kumar**