

PERSONAL STATEMENT

SYAMLAL S K

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Dear Professor,

My name is Syamlal S K. I have completed Master's degree in Physics from Dept. of Physics and Nanotechnology, SRM Institute of Science and Technology (SRMIST), India. I am interested to apply for Ph.D. position at Queen Mary University of London in the field of **Quantum Physics**. I look forward to work on this topic, which will provide me with an excellent opportunity to learn about quantum technologies. This unique experience will help me in achieving my goal to become a mainstream researcher in the field of Physics.

My major research experience came through Master's project work under the guidance of Dr. V. J Surya, Research Assistant Professor at SRM Institute of Science and Technology, India (URL: <http://www.srmuniv.ac.in/content/dr-v-j-surya>). The main focus of our research is to understand how different gas molecules interact with water molecules in the atmosphere using computational approaches.

As we know, the intensity of various toxic gases is increasing in our environment due to vehicles, industries, factories and so on. In a way, pollution has consumed all our basic needs such as air, water, and food. Therefore, we are concentrating on different remedial measures to reduce the pollution especially in air and water.

We selected 14 gases including toxic and non-toxic, polar and non-polar gases for our comparative analysis. First principles approach using density functional theory (DFT) has been used for the investigations. Initially, we have used VASP and later, to gain a better understanding through various analysis, we have moved to Gaussian 16 package (both are DFT Packages). Hartree Fock (HF) and Density Functional Theory (DFT) methods along with different basis sets have used for the study. Binding energy, Electrostatic Potential, Molecular Orbital and charge transfer analyses for all the gas molecules, water molecule, and water-gas clusters have performed. Results have shown that chlorine, sulfur dioxide and ammonia are highly interacting with water molecules among the selected 14 gas molecules. Nearly 10 months, I approached the problem in different ways of modelling and doing simulations to achieve good and reasonable results.

My project has been selected as one of the three best projects and I received the best project award during SCICONNECT, 2018 in our institute. I have written the manuscript with the results and it will be communicated to the Journal shortly. Moreover, I was selected to visit Shizuoka University, Japan during September 2017 through Sakura Exchange program and I have presented my work there.

During my Master's course I had a theoretical course on Quantum mechanics, statistical mechanics, Thermodynamics, Applied spectroscopy these courses made my fundamentals stronger. Also, I had an Experimental course on Nanomaterial synthesis and characterization laboratory. By this courses I am familiar with techniques like AFM, SEM, TEM, Raman Spectroscopy and XRD ion with water molecules. I got inspired by the research and I would like to do my doctorate in quantum physics.

Through the university website, I went through research areas, I found that it is very interesting within the limits of my understanding and aligned to my research interests. It would be a very rewarding experience to work on such an exciting project in an excellent research environment.

I am a person who is deeply absorbed by research. I try to devote all my efforts towards my research and strongly believe that hard work pays off well. Above all, I truly aspire to make a difference in the society with my research, and given the opportunity I shall strive hard to make it count. I am confident that I would be able to make a positive contribution to on-going research work at your institute. I request you to make a candid assessment of my abilities and consider my application for this program.

Thanking you in anticipation,

With Regards

SYAMLAL S. K