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Application Id : **PHYS1875**
KVPY(2011-2012)

Applicant Type	Student	**Area of Interest**	Physics Atomic, Nuclear and High Energy Physics

Personal Details

Initials / First Name	Atul Singh	**Last name**	Arora
Gender	Male	**Date of Birth**	20/11/1991
Email	toatularora@gmail.com		
Telephone		**Mobile**	8968172389
Correspondence Address	Room 710, Hostel 7, IISER Mohali, Knowledge city, Sector 81, SAS Nagar, Manauli PO 140306	**Permanent Address**	4317/3 Ansari Road, Darya Ganj, New Delhi - 110002
City	Mohali	**City**	New Delhi
State	Punjab	**State**	Delhi
Pincode	140306	**Pincode**	110002

Academic Details

	Year	**Institution**	**% / C.G.P.A**
SSLC / Class X	2008	Sardar Patel Vidyalaya, Delhi	91.00
PUC / Class XII	2010	Sardar Patel Vidyalaya, Delhi	80.00

Graduation

Name of the Course	BS-MS		
Institution	Indian Institute of Science Education and Research, Mohali		
City	Mohali		
Year/Semester	**Year**	**% / C.G.P.A**	
1	2011	8.50	
2	2012	8.60	
3	2012	8.60	

4			
5			
6			
7			
8			
Post Graduation			
Name of the course			
Institution			
City			
Year/Semester	**Year**	**% / C.G.P.A**	
1			
2			
3			
4			
Phd			
Year			
Institution			
Title of thesis			
Other qualification, if any(give details)			
Other Details			
Currently studying BS and MS	Year II	**Semester** IV	
Institution	Indian Institute of Science Education and Research, Mohali	**Place**	Mohali
Career record in chronological order			
Have you applied previously to Academy Fellowships? If yes mention year and Reg No.	NO		
Have you been selected previously? If yes mention year,subject area and guide	NO		

Training / projects undertaken,if any (give details)

Summer 2012 Intern, Indian Institute of Science Education and Research, Mohali. Studied Group Theory and Linear Algebra for understanding Symmetry, under Prof. Kapil Hari Paranjape. A brief introductory understanding of the Knot Theory was also undertaken. LaTeX was learnt during this period, to be able to efficiently communicate via the internet. Summer 2011 Intern, Indian Institute of Technology, Bombay. Worked on Image Recognition techniques using OpenCV, for Yarn Fault detection under the supervision of Prof. Anirban Guha. This was an extension to an IIT alumni's Masters thesis. The work was done using Visual Studio, C++ and involved understanding of OpenCV and the idea behind various algorithms, to be able to solve the problem at hand. Sem III 2012 Opportunity Cell Website, Team Project, A centralized web portal for the Opportunity Cell of IISER Mohali. Sem III 2012 Fly Count Assistor, For easing the task of counting flies (Biology experiment), this application was written in Python and used extensively. With just two buttons on the keyboard, and the voice support, the counting process was made much more efficient. Sem III 2012 NaveenTantra, Team Project, An Online Election system, based on a novel fraud prevention technique, created using Javascript, PHP and mySQL. Summer 2012 Telescope, Team Project, Newtonian Reflection Telescope for observing Transit of Venus. Sem II 2012 Capacitive Touch Sensor, Sensitive enough to measure changes in PicoFarads, developed for the Science Day. 2010 11 Chatur Chaalak, Developed with the aim of application in robotics, this project was designed to control the torque and speed of stepper motors, with precision, independently. This was implemented using C as the language and Atmel AVR as the platform. 2010 Live GSM, This was an attempt at controlling a phone using a microcontroller, to be able to remotely control devices, using DTMF communication protocol over voice calls. Class XII 2010 3D Modelling and Animation, Imitated the '21st Century FOX' animation and customized it to read 'XII class presents', for a class presentation, using the popular 3D cinema creation software, Maya. Class XI XII 2009 10 Space Race, This game was developed using OpenGL to ensure crossplatform support and as a transition to the open world. Apart from the 3Dgraphics, this game had Newtonian physics implemented using a point particle approach, derived from an opensource game. Class XI 2009 Robotic Rescue Vehicle (RRV), It was designed using automobile parts such as bicycle chains and sprockets, wiper motors, car batteries, a webcamera, and an ordinary PC, which gave it a unique look. It could be moved around wirelessly using a laptop which gave a live video feed from the robot, ideal for rescue operations. Class X 2008 Math Project, A calculator built using microcontrollers, to verify a algebraic property. It was a battery operated device, with an LCD screen and used an 89S52 to process. Class IX 2006 ALive City 2 : DirectX 9.0, My second attempt at game making; this was developed without using any game engines, while the game itself was controlled using a USB steering wheel, built by me, based on an opensource application. Class VIII 2005 Motion Detection : Image Processing, This program was developed to save frames of a video feed, only when motion is detected, ideal for surveillance. Class VIII 2005 ALive City : DirectX 8.0, My first computer graphics 3D project, a simple racing game where the player could put his or her own picture, right on the car. Class VII 2004 Edge Detecting Robot, Built using stepper motors and a microprocessor, this vehicle was programmed to detect edges of a table using infra red sensors and turn to avoid falling. Class VII 2004 AT Keyboard Interface, Built using the 8051 series of Microcontrollers and an LCD, this device was developed to serve as a low cost portable typing tutor for kids. It was programmed using Bascom, a basic compiler. Class VII 2004 School Bell Scheduler 2, This application was rewritten in Visual Basic.NET to automate ringing of school bells, given the schedule, like it's first version. It used UART for securer communication and was installed in Srijan School, Model Town, New Delhi. Class VI 2003 School Bell Scheduler, A program, written in Visual Basic 6, for automating the ringing of school bells. The user simply needs to specify the schedule.

Are you now in receipt any other fellowship: Yes/No. If Yes: Specify name of the fellowship and year

Fellowship Name:	KVPY ☑	INSPIRE ☐	Any other
Duration:	2011-2012		
Amount Received as Monthly Fellowship Rs	5000		

Extra-curricular activities, if any

Playing the Guitar Programming and Electronics Member of the Debating Society Playing the Tabla Red I in Taekwondo

Any other information

Computer Skills Familiar OSs Windows: XP, Vista, 7; Linux: Ubuntu, OpenSuse Languages Basic, C, C++, C#, Python, Javascript, SQL, HTML, PHP, LaTeX Applications Visual Studio, Sublime Text, Microsoft Office (Word, Powerpoint, Outlook, OneNote, Excel), CorelDraw, Git, Sony Vegas, Autodesk Maya, GNU plot, SolidWorks, FL Studio, Sony Sound Forge Recognition 2012 Capacitive touch won the Best Physics Demonstration, at the Science Day 2012, organized by IISER Mohali 2011 Was awarded the KVPY fellowship, for my work on Stepper Motor control, Chatur Chaalak 2010 Was awarded the First position in Senior programming, with my Team member, in an inter-school programming competition, a part of Access, an annual Computer Symposium, Access, organized by Modern School 2010 I was selected as one of the participants for attending the Bright Green Youth, Denmark, an international climate summit for the youth, on the basis of my performance in the National Science Fair and a personal interview. In DK, our team made it to the top 14 projects 2009 The Robotic Rescue Vehicle was awarded the first position in the Delhi region and second position in the Northern region, at the National Science Fair, held at the National Science Centre, New Delhi 2005 ALive City won the first place in the open Software Display, at an inter-school Computer Symposium, Access, an annual event organized by Modern School, Barakhamba Road, New Delhi 2004 ALive City qualified the open Software Display, at the inter-school Computer Symposium, Access 2004 Displayed the Robotic Rescue Vehicle at an interschool competition and secured the third position, even though due to a component failure, the robot failed to work when it was judged 2003 Displayed the School Bell Scheduler at the National Convention 2003, Computer Society of India, IIT-Delhi http://github.com/toAtulArora http://KnowledgePayback.blogspot.com

Names of Guides with whom you would like to work	FL119 Prof. Anil Kumar FL947 Prof. Archan S. Majumdar FL644 Prof. R. Simon FL1476 Dr Anil Shaji FL880 Prof. Prasanta Panigrahi FL1152 Dr Sibasish Ghosh
Suggested dates convenient for the applicant to work	May To Jul

A write-up (not exceeding 250 words) as to the specific area of interest of the applicant and what he/she would like to learn and achieve through this fellowship. It can also include the specific experiment or theory that the applicant wants to work on but NOT a general description of the area.

Science, as we see it in its final form, is mostly results which can be derived using a set of basic assumptions, which conform to experimental findings. However the process through which these were

discovered/invented, the unseen human effort behind it, is what I wish to explore through this opportunity. My basic area of interest is physics, and quite frankly, I haven't even studied most of the broad topics to be able to narrow it sufficiently to a research level problem. I am interested in Quantum Mechanics, Cosmology, Relativity and Computing. Mathematics is just as close to my heart, and studying topics like Linear Algebra/Group Theory, Symmetry, Differential Geometry has been very enjoyable for me. I got especially interested in Quantum Mechanics and specifically Quantum Computing, after attending a seminar on the Nobel Prize for Physics, 2012, which had its basics rooted in Quantum Entanglement. To be comfortable with Quantum Mechanics, I spent my last summer studying "Linear Algebra" by M. Artin, till Chapter 7. This winter I started "Modern Quantum Mechanics" by JJ Sakurai, to make the counter intuitive subject, a comfort zone. I have experience with, and have completed various projects using C/C++, Python, PHP, SQL, Basic and Javascript. I have also worked with microcontrollers (8051 and AVR). I now wish to apply these skills and learn more to work on Experimental Quantum Mechanics and Computing. In summary, I wish to do experimental work and/or theoretical study with mathematical rigour, in areas related to Quantum Computing and Mechanics.

Declaration: I confirm that the information given above is correct. I have also read the terms and conditions attached to the Summer Research Fellowship Programme 2013 as mentioned on the websites of the three Academies and shall abide by the same.

Place:	**Name:**
Date:	**Signature:**

Recommendation letter by teacher:

(Please tick the box)

Attached with this application: ☐

Sending separately: ☐