

## Department of Physical Sciences

The Department offers Post-graduate research program in Physics. The Department has well equipped laboratories, which allows students to explore a variety of experiments, thereby helping them in understanding the fundamental aspects of the subject. A list of advanced elective courses in the Department offer a glimpse in the frontier areas of research and allow students to select a topic for one-year research project. The faculty in the Department is highly talented and motivated. The faculty uses latest technology and innovative methods for teaching. Faculty members are encouraged to participate in the National and International conferences/ workshops to update themselves in line with the latest developments in their research area and field of specialization.

### Programme Offered

Programme	Intake	Duration
M.Sc. Physics	25	02 years

### Research Areas

- Theoretical Solid State Physics.
- Advanced Theoretical and Computational Physics for investigating Structural, Electronics and magnetic properties of Nano Materials.
- Renewable Sources of Energy.
- Experimental Nuclear Physics.
- Theoretical High Energy Physics.

### Infrastructure

#### Post Graduate Laboratories:

The Department has well equipped laboratories with latest equipment to conduct experiments in the following fields:

- Condensed Matter Physics
- Advanced Electronics
- Atomic, Molecular and Nuclear Physics
- Computational Physics

#### Research Laboratories

Computational Simulation Laboratory equipped with 20 Computers of high configuration for theoretical studies simulations in diverse areas of Physics.

### Faculty Members

Name	Designation	Specialisation	Experience
Dr. Amit Sarin	Associate Professor & Head	Renewable Energy and Materials Science	16 years
Dr. Hitesh Sharma	Assistant Professor	Condensed Matter Physics	13 years 6 months
Dr. Maninder Kaur	Assistant Professor	Experimental Nuclear Physics	3 years 3 months

Dr. Varinderjit Singh	Assistant Professor	Experimental Nuclear Physics	4 years 5 months
Dr. Neetika	Assistant Professor	Theoretical High Energy Physics	3 years

### Projects Undertaken by Faculty:

Project Title	Funding Agency	Principal Investigator	Sanctioned Amount
Physico-chemical characterization of methyl oleate-methyl palmitate blend as a model system for Jatropha-Palm biodiesel.	Science and Engineering Research Board, New Delhi.	Dr. Amit Sarin	27 Lakh
Tuning Graphene Nanostructures for Gas Sensor Applications	Council of Scientific & Industrial Research, New Delhi	Dr. Hitesh Sharma	26.10 Lakh
Ab-initio investigation of catalytic effect of nanostructures on metal Hydrides	Department of Science and Technology	Dr. Hitesh Sharma	11.46 Lakh
To investigate the effect of deformation on nuclear dissipation	Inter University Accelerator Centre, New Delhi.	Dr. Maninder Kaur	6.75 Lakh
Investigation of fusion enhancement for neutron-rich symmetric systems near and below the fusion barrier	Inter University Accelerator Centre, New Delhi.	Dr. Varinderjit Singh	6.75 Lakh
To study the effect of the shell closure on fission dynamics	Inter University Accelerator Centre, New Delhi.	Dr. Varinderjit Singh	Nil

### Research Scholars:

Name	Title of Thesis	PhD Supervisor
Meetu Singh	Impact of radiations on stability of fuels synthesized from oils	Dr. Amit Sarin
Amit Sethi	Thermal and optical characterization of Sn-Se-Te glasses doped with Sb and In	Dr. Amit Sarin
Meenakshi	Improving energetics of solid state hydrogen storage using carbon nanostructures using First principle calculations	Dr. Hitesh Sharma
Sandeep Kumar	Structural, Electronic and Transport Properties of Graphene Nanoribbons using Density Functional Theory.	Dr. Hitesh Sharma
Deepak	Investigation of functionalized Carbon	Dr. Hitesh Sharma

Agnihotri	nanostructures using Density Functional Theory for Hydrogen storage	
-----------	---	--

### Events Organised:

- Guest Lecture on “**A digital approach to  $\gamma$ -ray Time-of-Flight investigation using fast scintillator detector**” by Dr. Davinder Siwal, D.S. Kothari Post-doctoral fellow, Department of Physics, Panjab University, Chandigarh. (April 11, 2018)
- Guest Lecture on “**Study of exotic nuclei and their applications to nuclear astrophysics**” by Dr. Shubhchintak, Research Associate, Department of Physics and Astronomy, Texas A&M University Commerce, Texas-75428, USA. (September 06, 2017).

### Faculty Participation/Paper Presentations in Conferences:

- Kaur, Maninder (2017), “**Investigating the dynamics of heavy-ion induced fusion reactions**” invited talk in *ICNP Conference* held at Department of Physics, Panjab University, Chandigarh from March 15-18, 2017 (Co-authors- B.R. Behera, Gulzar Singh, Varinderjit Singh, N. Madhavan, S. Muralithar, S. Nath, J. Gehlot, G. Mohanto, Ish Mukul, D. Siwal, M. Thakur, K. Kapoor, P. Sharma, T. Banerjee, A. Jhingan, T. Varughese, Indu Bala, B.K. Nayak, A. Saxena, M.B. Chatterjee and P.D. Stevenson).
- Sharma, Neetika (2017), “**Prediction of the diffractive phi meson production using an AdS/QCD light-front wavefunction**” published at *AIP Conf. Proc. 1819, 030011*(Co-authors - Mohammad Ahmady, Ruben Sandapen).

### Faculty Publications:

- Gurau, Singh, Virender, Agarwal, Shankar, Mudit, Sarin, Amit and Sandhu Singh, Sarbjot (2016), “**An Experimental Study on Storage and Oxidation Stability of Bitter Apricot Kernel Oil Biodiesel**”, *Energy & Fuels (ACS)*, Volume 30, Issue 10, 8377-8385.
- Sharma, N., Sharma, S., Sarin, A. and Kumar, R. (2016), “**Effect of Sb addition on linear and non-linear optical properties of amorphous Ge-Se-Sn thin films**”, *Optical Materials*, Volume 51, 56-61.
- Meenakshi, Agnihotri, Deepak and Sharma, Hitesh (2016), “**Carbon nanotubes for improving dehydrogenation from NaAlH<sub>4</sub>**”, *Computational and Theoretical Chemistry*, Volume 1097, 61-69.
- Meenakshi, Agnihotri, Deepak, Jeet, Kiran and Sharma, Hitesh (2016), “**Improvement in dehydrogenation of MXH<sub>4</sub> where M = Na, Li and X = Al, B confined in CNTs: a DFT investigation**”, *Mater. Res. Express*, Volume 3, 115013.
- Montagnoli, G., Stefanini, A.M., Jiang, C.L., Hagino, K., Galtarossa, F., Colucci, G., Bottoni, S., Brogini, C., Cacioli, A., Colovi, P., Corradi, L., Courtin, S., Depalo, R., Fioretto, E., Fruet, G., Gal, A., Goasduff, A., Heine, M., Hu, S.P., Kaur, M., Mijatovi, T., Mazzocco, M., Montanari, D., Scarlassara, F., Strano, E., Szilner, S. and Zhang (2018), “**Fusion hindrance for the positive Q-value systems  $^{12}\text{C} + ^{30}\text{Si}$** ”, *Physical Review C*, Volume 97, 024610.
- Kaur, Rupinder, Kaur, Maninder, Singh, BirBikram and Singh, Varinderjit (2017), “**Investigating the effect of shell closure on fusion-fission dynamics by estimating the fission delay**”, *DAE-BRNS Symp. on Nucl. Phys. Patiala (India)*, Volume 62, 658-660.
- Singh, Varinderjit, Vadas, J., Steinbach, T.K., Wiggins, B.B., Hudan, S., deSouza,

R.T., Lin, Zidu, Horowitz, C.J., Baby, L.T., Kuvin, S.A., Tripathi, Vandana, WiedenhÖver, I. and Umar, A.S. (2017), “**Fusion Enhancement at near and sub-barrier energies in  $^{19}\text{O} + ^{12}\text{C}$** ”, *Physics Letter B*, Volume 765, 99-103.

- Wiggins, B.B., Singh, Varinderjit, Vadas, J., Huston, J., Steinbach, T.K., Hudan, S. and deSouza, R.T. (2017), “**Development of a compact E x B microchannel plate detector for beam imaging**”, *Nuclear Instrumentation and Methods in Physics Research A*, Volume 866, 202-206.
- Ahmady, Mohammad, Sandapen, Ruben and Sharma, Neetika (2016), “**Diffractional rho and phi vector meson production at HERA using a holographic light-front wavefunction**”, *Physical Review D*, Volume 94, 074018.
- Sharma, Neetika (2016), “**Hard gluon evolution of nucleon Generalized Parton Distributions in the Light-front quark model**”, *European Physics Journal. A*, Volume 52, Issue 4, 91.

### **M.Sc. Students working in Computation Lab.**



**M.Sc. Students working in Electronics Lab.**



## Guest Lectures organized by Department of Physical Sciences





**Students Performing on Lohri Celebrations**

