

6. ACADEMIC ACTIVITIES

6.1 BEAM UTILIZATION BY USERS

6.1.1 LEIBF (Positive & Negative Ion) Beam Time Utilization and Experiments performed (April, 2016 to March, 2017)

Users	No. of Shifts used (1 Shift =8Hrs.)	Project in	
		Materials Science	Atomic Physics
A. Universities/Colleges			
Anna University, Chennai	12	2	
Central University of Jharkhand, Ranchi	6	1	
Devi Ahilya University, Indore	6	1	
Guru Ghasidas Vishwavidyalay, Bilaspur	3	1	
Guru Gobind Singh Indraprastha University, New Delhi	3	1	
Guru Nanak Dev University, Amritsar	3	1	
Jamia Milia Islamia (JMI), New Delhi	9		1
Jawaharlal Nehru University (JNU), New Delhi	1	1	
Kurukshetra University, Kurukshetra	3	1	
Saurashtra University, Rajkot	9	1	
Shiv Nadar University, Gautam Buddha Nagar (UP)	5	1	
University of Delhi (DU), Delhi	14	2	1
University of Mysore, Mysore	6	1	
University of Rajasthan, Jaipur	6	1	
B. Institutions			
All India Institute of Medical Sciences, Delhi	1	1	
Birla Institute of Technology, Jharkhand	3	1	
Calcutta Institute of Engineering and Management, Kolkatta	3	1	
Indian Institute of Space Science and Technology, Trivandrum	30		2
Indian Institute of Technology (IIT), Delhi	5	1	
Indian Institute of Technology (IIT), Roorkee	3	1	
Institute of Physics, Bhubaneswar	3	1	
Inter-University Accelerator Centre (IUAC), New Delhi	30	3	1
Malaviya National Institute of Technology (MNIT), Jaipur	9	2	
National Institute of Science Education and Research, Bhubaneswar	4	1	
National Institute of Science Education and Research, Pune	16		1
National Institute of Technology, Assam	6	1	
National Institute of Technology, Srinagar	6	2	
National Physical Laboratory, New Delhi	9	2	
Solid State Physics Laboratory (SSPL), DRDO, Delhi	1	1	
C. Facility Tests	11		4
TOTAL	226	33	10

6.1.2 Pelletron Beam Time Utilization and Experiments performed (April, 2016 to March, 2017)

Users	No. of Shifts allotted	Project in				
		Nuclear Physics	Materials Science	Radiation Biology	Atomic Physics	AMS
A. Universities/Colleges						
Andhra University, Waltair	6	1				
Anna University, Chennai	60					2
Archaeological Survey of India, Delhi	15					1
Archaeological Survey of India, Vadodara	15					1
Banaras Hindu University (BHU), Varanasi	33	2		1		
Devi Ahilya University (DAU), Indore	3		1			
Dr. B Ambedkar Marathwada University, Aurangabad	3		1			
Gautam Buddha University, Greater Noida	3		1			
Gurudas College, Kolkata	3		1			
Guru Gobind Singh Indraprastha University, New Delhi	3		1			
Guru Nanak Dev University (GNDU), Amritsar	3		1			
Hemwati Nandan Bahuguna Garhwal University, Garhwal	3		1			
Jawaharlal Nehru University (JNU), New Delhi	14		1			1
KIIT University, Bhubaneswar	4		1			
Kurukshetra University, Kurukshetra	5	1				
Panjab University (PU), Chandigarh	27	1	1			
Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur	3		1			
Saurashtra University, Rajkot	2		1			
Shri Venkateswara College, Delhi	2		1			
Tezpur University, Tezpur	6		2			
University and Petroleum & Energy Studies, Dehradun	3		1			
UGC-DAE-CSR, Indore	3		1			
UGC-DAE-CSR, Kolkata	15	1				
University of Delhi (DU), Delhi	61	4	2			
University of Hyderabad, Hyderabad	3		1			
University of Lucknow, Lucknow	10					1
University of Kalyani, Kalyani	3			1		
University of Kerala, Thiruvanthapuram	15	1				
University of Mumbai, Mumbai	18	1				
University of Mysore, Mysore	3		1			

Users	No. of Shifts allotted	Project in				
		Nuclear Physics	Materials Science	Radiation Biology	Atomic Physics	AMS
University of Notre Dame, Notre Dame (USA)	21	1				
University of Sheffield, Sheffield	3		1			
Vardhman College, Bijnor	3		1			
B. Institutions						
All India Institute of Medical Sciences, Delhi	3		1			
Bhabha Atomic Research Centre (BARC), Mumbai	42	2				
Birbal Sahni Institute of Palaeobotany, Lucknow	20					1
Indian Institute of Technology (IIT), Delhi	5		2			
Indian Institute of Technology Gandhinagar, Gujarat	20					1
Indian Institute of Technology Bombay (IITB), Mumbai	15	1				
Indian Institute of Technology (IIT), Roorkee	12	1				
Indian School of Mines, Dhanbad	3		1			
Indian Space Research Organisation, Bangalore	4	1				
Institute for Plasma Research, Gandhinagar	2		1			
Institute of Minerals and Materials Technology, Bhubaneswar	4		1			
Inter-University Accelerator Centre (IUAC), New Delhi	36	1	5			
Jai Prakash Vishwavidyalaya, Chapra	15				1	
Malaviya National Institute of Technology (MNIT), Jaipur	3		1			
National Institute of Technology, Hamirpur (HP)	2		1			
Physical Research Laboratory, Ahmedabad	6		1			
Semi-Conductor Laboratory, Mohali	8	2	1			
Tata Institute of Fundamental Research, Mumbai	15	1				
Variable Energy Cyclotron Centre, Kolkata	18	1				
Visva-Bharati, Santiniketan	15	1				
C. Facility Tests						
	19	3	1			
TOTAL	644	27	40	2	1	8

6.1.3 List of Users Family

The following list includes Universities/Colleges/Institutions that have used the IUAC Pelletron facility (once or more) since 1991.

(A) UNIVERSITIES - (111)

1.	Acharya Nagarjuna University	Andhra Pradesh
2.	Alagappa University	Karaikudi
3.	Aligarh Muslim University	Aligarh
4.	Amity University	Noida
5.	Andhra University	Waltair
6.	Anna University	Chennai
7.	Assam University	Silchar
8.	Babasaheb Bhimrao Ambedkar University	Lucknow
9.	Banaras Hindu University	Varanasi
10.	Bangalore University	Bangalore
11.	Berhampur University	Berhampur
12.	Bharathiar University	Coimbatore
13.	Bharathidasan University	Tiruchirappalli
14.	Bhavnagar University	Bhavnagar
15.	Calicut University	Calicut
16.	Central University of Haryana	Mahendragarh
17.	Central University of Jharkhand	Ranchi
18.	Central University of Kerala	Kerala
19.	Central University of Rajasthan	Rajasthan
20.	Chaudhary Charan Singh University	Meerut
21.	Cochin University of Science & Technology	Cochin
22.	Delhi Technological University	Delhi
23.	Devi Ahilya University	Indore
24.	Dr. Babasaheb Ambedkar Marathwada University	Aurangabad
25.	Dr. B.R. Ambedkar Univ. (Agra University)	Agra
26.	Gauhati University	Guwahati
27.	Gautam Buddha University	Greater Noida
28.	Goa University	Goa

29.	Govind Ballabh Pant University of Agriculture and Technology	Pantnagar
30.	Gujarat University	Ahmedabad
31.	Gulbarga University	Gulbarga
32.	Guru Ghasidas Vishwavidyalaya	Bilaspur
33.	Guru Gobind Singh Indraprastha University	New Delhi
34.	Guru Jambheshwar University of Science & Technology	Hisar
35.	Guru Nanak Dev University	Amritsar
36.	Hemwati Nandan Bahuguna Garhwal University	Srinagar, Garhwal
37.	Himachal Pradesh University	Simla
38.	Indira Gandhi National Open University	New Delhi
39.	Jamia Millia Islamia University	New Delhi
40.	Jawaharlal Nehru University	Delhi
41.	Jai Prakash Vishwavidyalaya	Chapra
42.	K.R. Mangalam University	Gurgaon
43.	Karnataka University	Dharwad
44.	Kolhan University	Chaibasa
45.	Kiel University	Germany
46.	Kurukshetra University	Kurukshetra
47.	Kuvempu University	Shankaraghatta, Shimoga
48.	Ludwig-Maximilians-Universität München	Germany
49.	Madurai Kamaraj University	Madurai
50.	Maharshi Dayanand University	Rohtak
51.	Maharishi Markandeshwar University	Ambala
52.	Mahatma Gandhi University	Kottayam
53.	Mahatma Jyotiba Phule Rohilkhand University	Bareilly
54.	Manav Rachna International University	Faridabad
55.	Mangalore University	Mangalore
56.	Manipur University	Imphal
57.	Manonmaniam Sundaranar University	Tirunelveli
58.	Mohanlal Sukhadia University	Udaipur
59.	Rashtrasant Tukadoji Maharaj Nagpur University	Nagpur
60.	North Carolina State University	USA
61.	North Eastern Hill University	Shillong

62.	North Maharashtra University	Jalgaon
63.	North Orissa University	Baripada
64.	Osaka University	Japan
65.	Osmania University	Hyderabad
66.	Panjab University	Chandigarh
67.	Patna University	Patna
68.	Periyar University	Chennai
69.	Pondicherry University	Pondicherry
70.	Punjab Agricultural University	Ludhiana
71.	Punjabi University	Patiala
72.	P.E.S. Institute of Technology	Bangalore
73.	Rani Durgavati Vishwavidyalaya	Jabalpur
74.	Sabancı University	Turkey
75.	Saint Petersburg Polytechnic University	Russia
76.	Saurashtra University	Rajkot
77.	Savitribai Phule Pune University	Pune
78.	Sharda University	Noida
79.	Shiv Nadar University	Uttar Pradash
80.	Shivaji University	Kolhapur
81.	Shri Mata Vaishno Devi University	Katra
82.	Sri Krishnadevaraya University	Anantapur
83.	Technische Universität Darmstadt	Darmstadt, Germany
84.	Tezpur University	Tezpur
85.	The Maharaja Sayajirao University of Baroda	Vadodara
86.	The University of Burdwan	Burdwan
87.	The University of Sheffield	Sheffield
88.	Tilka Manjhi Bhagalpur University	Bhagalpur
89.	Tumkur University	Tumkur
90.	University and Petroleum & Energy Studies	Dehradun
91.	University of Allahabad	Allahabad
92.	University of Calcutta	Kolkata
93.	University of Delhi	Delhi
94.	University of Hyderabad	Hyderabad

95.	University of Jammu	Jammu
96.	University of Kalyani	Kalyani
97.	University of Kashmir	Srinagar
98.	University at Lucknow	Lucknow
99.	University of Madras	Chennai
100.	University of Maryland	Maryland, USA
101.	University of Mumbai	Mumbai
102.	University of Mysore	Mysore
103.	University of Notre Dame	Notre Dame, USA
104.	University of Padova	Italy
105.	University of Pune	Pune
106.	University of Rajasthan	Jaipur
107.	University of Stuttgart	Germany
108.	Utkal University	Bhubaneswar
109.	Vikram University	Ujjain
110.	Vishwa Bharti University	Bolpur
111.	West Bengal University of Technology	Kolkata

(B) COLLEGES - (68)

1.	Anand International College of Engineering	Rajasthan
2.	Ananda Mohan College	Kolkata
3.	Archaeological Survey of India	Delhi
4.	Archaeological Survey of India	Vadodara
5.	Armed Forces Medical College	Pune
6.	Bareilly College	Bareilly
7.	Beant College of Engineering & Technology	Gurdaspur
8.	Bharatiya Jain Sanghatana College	Pune
9.	Bhiwandi College	Mumbai
10.	B.N.N. College	Bhiwandi
11.	College of Engineering and Technology	Aligarh
12.	Doodhsakhar Mahavidyalaya	Bidri, Maharashtra
13.	D.A.V. College	Jalandhar

14.	D.A.V. College	Kanpur
15.	D.A.V. College	Mumbai
16.	D.B.S. College	Dehradun
17.	Ewing Christian College	Allahabad
18.	Govt. Art College	Rajahmundry, AP
19.	Govt. College	Ajmer
20.	Govt. College	Kota
21.	Govt. College	Mahendragarh, Haryana
22.	Govt. M.S.J. College	Bharatpur
23.	Goalpara College	Goalpara, Assam
24.	Gurudas College	Kolkata
25.	Guru Nanak Girls College	Ludhiana (PNJ)
26.	G.F.(PG) College	Shahjahanpur
27.	Iswar Chandra Vidyasagar College (formerly Belonia College)	Belonia, Tripura
28.	Jai Hind College	Mumbai
29.	Kalindi College	New Delhi
30.	Kandi Raj College	Murshidabad, (WB)
31.	Kishinchand Chellaram College	Mumbai
32.	Kongunadu Arts & Science College	Coimbatore
33.	Koshi College	Khagaria, Bihar
34.	Krishnath College	West Bengal
35.	K.J. Somaiya College of Science & Commerce	Mumbai
36.	KIIT University	Bhubaneswar
37.	Lalbaba College, Kolkata	Kolkata
38.	Mahila Degree College	Lucknow
39.	Marwari College	Ranchi
40.	M.M.H. College	Ghaziabad
41.	M.R. College	Vizianagaram (AP)
42.	Nayagarh College	Nayagarh
43.	Nizam College	Hyderabad
44.	N.S.A.M. College	Mangalore
45.	Orissa Univ. of Agriculture & Tech.	Bhubaneswar
46.	Poorna Prajna College	Udupi, Karnataka

47.	Punjab Engineering College	Chandigarh
48.	R.B.S. College	Agra
49.	R.D. & D.J. College	Munger, Bihar
50.	R.P.G. College	Ratnagiri
51.	School of Physical Sciences	JNU, New Delhi
52.	School of Physical Sciences	Nanded, Maharashtra
53.	School of Tech. & Applied Sciences	Kottayam, Kerala
54.	Sharanabasaveshwar College of Science	Gulbarga
55.	Shri Venkateswara College	Delhi
56.	Smt. Chandibai Himathmal Mansukhani College	Ulhasnagar, Maharashtra
57.	Sri Bhuvanendra College	Karkala
58.	St. Edmunds College	Shillong
59.	St. Xavier's College	Kolkata
60.	Swami Shraddhanand College	New Delhi
61.	SDM College	Ujire, Mysore
62.	S.N. College	Kollam
63.	S.V. College	Aligarh
64.	University College	Kurukshetra
65.	University College of Science & Tech.	Kolkata
66.	Vaish College	Rohtak
67.	Vardhman College	Bijnor
68.	Zakir Husain College	Delhi

(C) OTHER INSTITUTIONS – (102)

1.	All India Institute of Medical Sciences	Delhi
2.	Amity School of Engineering	New Delhi
3.	Amity Institute of Nanotechnology	Noida
4.	Amrita Vishwa Vidyapeetham	Bangaluru
5.	Amrita School of Engineering	Bangalore
6.	AFM/XPS Laboratory	Bhubaneswar
7.	AICTE	New Delhi
8.	AIIMS	New Delhi

9.	Bangabasi Morning College	Kolkata
10.	Bhabha Atomic Research Centre	Mumbai
11.	Birbal Sahni Institute of Palaeobotany	Lucknow
12.	Birla Institute of Technology, Jharkhand	Ranchi
13.	Bose Institute	Kolkata
14.	Calcutta Institute of Engineering and Management, Kolkatta	Kolkata
15.	Centre for Superconductivity research	USA
16.	C.E.E.R.I.	Pilani
17.	CAT	Indore
18.	CCMB	Hyderabad
19.	CSNSM, Orsay Cedex	France
20.	Dayalbagh Educational Institute	Agra
21.	Defence Laboratory	Jodhpur
22.	Defence Research & Development Organ.	Dehradun
23.	Dr. B.R. Ambedkar National Institutes of Technology	Jalandhar
24.	D.M.R.L.	Hyderabad
25.	Flerov Laboratory of Nuclear Reactions	Russia
26.	Genetic Institute of Manufacturing Technology	Singapore
27.	GSI	Germany
28.	Harcourt Butler Technological Institute	Kanpur
29.	Homi Bhabha National Institute	Kolkata
30.	ICGEB	New Delhi
31.	IISER	Kolkata
32.	I.G.C.A.R.	Kalpakkam
33.	Indian Institute of Information Technology	Allahabad
34.	Indian Institute of Science	Bangalore
35.	Indian Institute of Space Science and Technology	Trivandrum
36.	Indian Institute of Technology-BHU	Varanasi
37.	Indian Institute of Technology	Chennai
38.	Indian Institute of Technology	Kanpur
39.	Indian Institute of Technology	Kharagpur
40.	Indian Institute of Technology Bombay	Mumbai
41.	Indian Institute of Technology Delhi	New Delhi

42.	Indian Institute of Technology	Rajasthan
43.	Indian Institute of Technology	Roorkee
44.	Indian School of Mines	Dhanbad
45.	Indian Space Research Organisation	Bangalore
46.	Institute for Plasma Research	Gandhinagar
47.	Institute of Basic Sciences	Agra
48.	Institute of Energy and Climate Research	Germany
49.	Institute of Materials Science	Bhubaneswar
50.	Institute of Minerals and Materials Technology	Bhubaneswar
51.	Institute of Physics	Bhubaneswar
52.	Institute of Science	Mumbai
53.	International Centre for Genetic Engineering and Biotechnology	New Delhi
54.	INFN-LEGNARO	Italy
55.	INMAS	New Delhi
56.	IUC-DAEF, Calcutta Centre	Kolkata
57.	IUC-DAEF, Indore Centre	Indore
58.	Jaypee Institute of Information Technology	Noida
59.	Joint Inst. of Nuclear Research	Dubna, Russia
60.	Malaviya National Institute of Technology	Jaipur
61.	Massachusetts Inst. of Technology	USA
62.	Maulana Azad National Institute of Technology	Bhopal
63.	Ministry of Defence (R & D Orgn)	Delhi
64.	Motilal Nehru National Institute of Technology	Allahabad
65.	Nanocrystals Technology	USA
66.	National Academy of Science	Allahabad
67.	National Institute for Material Sciences	Japan
68.	National Institute of Material Sciences	Japan
69.	National Institute of Oceanography	Goa
70.	National Institute of Science Education and Research	Bhubaneswar
71.	National Institute of Technology, Hamirpur	Himachal Pradesh
72.	National Institute of Technology	Jalandhar
73.	National Institute of Technology	Kurukshetra
74.	National Institute of Technology	Rourkela

75.	National Institute of Technology	Silchar
76.	National Institute of Technology	Srinagar
77.	National Institute of Technology	Tiruchirapalli
78.	National Physical Laboratory	New Delhi
79.	NCAOR	Goa
80.	NCCCM/BARC	Hyderabad
81.	NCSR	France
82.	NISER	Bhubaneswar
83.	NISER	Pune
84.	Oak Ridge National Laboratory	USA
85.	Physical Research Laboratory	Ahmedabad
86.	Research Centre Imarat (RCI), DRDO	Hyderabad
87.	Saha Institute of Nuclear Physics	Kolkata
88.	Sant Longowal Institute of Engineering & Technology	Sangrur (Punjab)
89.	Semi-Conductor Laboratory	Mohali
90.	Solid State Physics Laboratory, DRDO	Delhi
91.	SSPL	New Delhi
92.	SUNAG Laboratory	Odisha
93.	Tata Institute of Fundamental Research	Mumbai
94.	Thapar Institute of Engineering & Technology (Thapar University)	Patiala
95.	UGC-DAE-CSR	Indore
96.	UGC-DAE-CSR	Kolkata
97.	UM-DAC Centre for Excellence in Basic Sciences	Mumbai
98.	Variable Energy Cyclotron Centre	Kolkata
99.	Vidya Prasarak Mandal's Polytechnic	Maharashtra
100.	Visva-Bharati	Santiniketan
101.	V.P.M's Polytechnic	Maharashtra
102.	Wadia Institute of Himalayan Geology	Dehradun

6.2 STUDENT PROGRAMMES

6.2.1 IUAC Summer Programme 2016 for B.Sc. (Physics) Students

Subir Nath

The Summer Programme 2016 for B. Sc. (Physics) students were held at IUAC from June 01-28, 2016. The aims of the programme are to expose young students to research opportunities in experimental physics and impart hands-on training to them by scientists of IUAC. Online applications were invited from students studying in the second or third year of B. Sc. or integrated M. Sc. courses with specialization in physics. Seventeen students were selected for participation in the Summer Programme who were provided travel support, boarding and lodging. Each student was assigned an experimental project under the supervision of a scientist of IUAC. In the last week of the Programme, upon completion of the assigned project, each participant submitted a report on the work carried out and made a presentation. Ms. Disha J. Kuzhively from National Institute of Science Education and Research, Bhubaneswar won the award for the best project presentation. Eight special lectures were arranged for the students to acquaint them with research opportunities in the fields of accelerator based basic sciences at IUAC and elsewhere. The students could also visit the accelerators and the experimental facilities of IUAC.



Summer Students, 2016

6.2.2 M. Sc. Orientation Programme

R Mehta

Inter-University Accelerator Centre (IUAC) conducts M. Sc. Orientation Programme to encourage interested students to supplement their knowledge and to motivate them to continue their career in science. This programme has been envisaged to provide hands-on training in fields associated with accelerator / ion beam based research to selected M. Sc. students by way of short projects. The duration of M. Sc. Orientation programme is three weeks. It is open throughout the year. Student can apply for this programme based on their convenient time. Applications can be submitted online only. This flexibility allows the students to choose the project period without hampering their main study course. Following students participated in this programme.

S.No.	Name	Affiliation
1	Ms. SakshiPatwal	H N B G University
2	Mr. Sai Raj Ali	JamiaMilliaIslamia
3	Ms K Purvaja	University of Madras
4	Mr. Vivek Chaudhary	Allahabad University
5	Mr. K Aditya	JamiaMilliaIslamia
6	Mr. Olin Lyod Pinto	Manipal University
7	Mr. DhruvRastogi	Punjab University
8	Ms. Navjot Kaur	Punjab University

S.No.	Name	Affiliation
9	Mr. Sandeep B. Somvanshi	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
10	Mr. Palash Jyoti Boruah	Gauhati University
11	Mr. Deepak Prajapat	National Institute of Technology Rourkela
12	Ms. Versha Venugopal	NIT Srinagar
13	Mr. Anupam Raj	NIT Srinagar
14	Ms. Ayana Sarkar	NIT Jamshedpur

Details of this programme can be accessed at: <http://www.iuac.res.in/sc/msc/index.html>

Online Application Portal: <http://www.iuac.res.in/indico/event/mscop>

6.2.3 PhD Teaching Programme

P.N. Prakash and P. Sugathan

The two semester Ph.D teaching programme for the research students of IUAC, research students from other universities and new trainee scientists of IUAC, continued during the current academic year. The programme has been receiving excellent response from students belonging to different universities. During this academic year, the course content was revised, where necessary, and the modules were reorganized between the two semesters. The programme consists of two semesters—the first semester, held during August-December, offers courses in Advanced Physics, Computational Techniques and Experimental Physics, while the second semester, held during January-May, offers courses in Advanced Condensed Matter Physics, Advanced Nuclear Physics and Accelerator Physics. A course on Research Methodology has also been included in the course work. In addition, the JRFs selected by IUAC and registered with Jawaharlal Nehru University for their PhD degrees and the new trainee scientists have to carry out lab work in vacuum lab, target development lab, electronics lab and detector development lab.

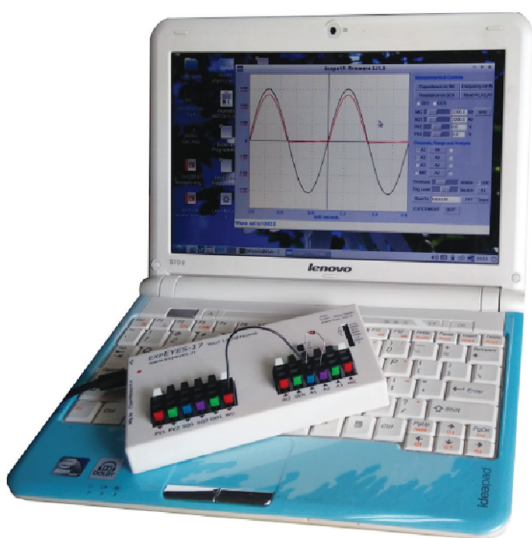
The courses on Advanced Classical & Quantum Mechanics, Experimental Physics, Advanced Condensed Matter Physics, Advanced Nuclear Physics and Accelerator Physics are 3 credit point courses, while the courses on Statistical Physics and Computational Techniques are 2 credit point courses.

About a month before the semester commences, a poster containing details of the course modules and their schedule, is uploaded on the IUAC website. The printed version of the poster is also sent to the physics departments of various universities and colleges for inviting applications. Accommodation and TA/DA is provided to the selected participants.

6.2.4 Teaching Laboratory Activities

Ajith Kumar B P. & V V V Satyanarayana

As a part of IUAC's outreach program, we develop computer interfaced laboratory equipment and train teachers in modern experimental data acquisition and analysis methods. A general purpose computer interface named ExpEYES-17 (Experiments for Young Engineers and Scientists) was released this year under PHOENIX project at IUAC. **ExpEYES-17** is an advanced version of expEYES-Junior released earlier. It is meant to be a tool for learning by exploration, suitable for high school classes and above. We have tried optimizing the design to be simple, flexible, rugged and low cost. The low price makes it affordable to individuals and we hope to see students performing experiments outside the four walls of the laboratory that closes when the bell rings.



A tool for learning science by exploring and experimenting. 50 documented experiments and easy to add more.

- Wide range, High school and above.
- 4 channel Oscilloscope, 1Msps, +/-16V input range
- Sine/Triangular Wave Generator, 5Hz to 5kHz
- Programmable voltage sources, +/5V and +/-3.3V
- Frequency Counter and time measurements.
- Supports I2C standard sensors
- 12bit analog resolution.
- Open Hardware and Free Software.
- Software in Python programming language.
- Requires USB port and Python.

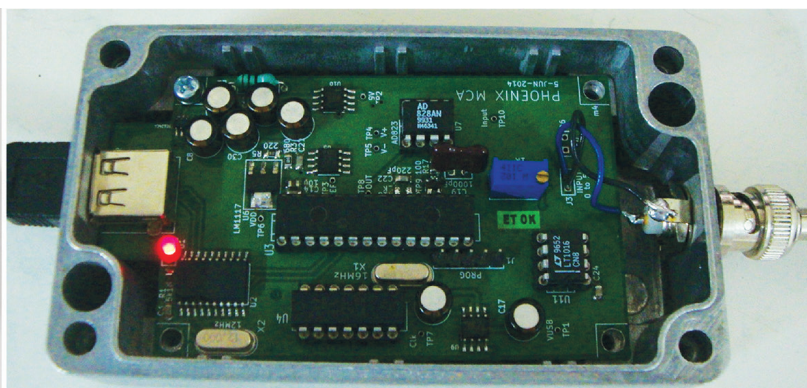
The software is released under GNU General Public License and the hard-ware under CERN Open Hardware License. The project has progressed due to the active participation and contributions from the user community and many other persons outside IUAC. We are thankful to Dr D Kanjilal for taking necessary steps to obtain this new design from its developer Jithin B P, Cspark Research.

Alpha Spectrometer

The Alpha Spectrometer developed at IUAC in the past has been re-designed to improve its performance in terms of improving signal to noise ratio and reliability. It consists of a small vacuum chamber, Pre-Amplifier, Shaping Amplifier and a 512 channel MCA with USB interface. The unit is powered by a 12V DC adapter. The Shaping amplifier output, a Gaussian shaped pulse in the 0 to 5V range, is available on the BNC connector. This is fed to the MCA for generating the spectrum. The MCA has a USB interface and also it is powered by USB. A modified version of this unit, with integrated MCA having 1024 channels, is now commercially available. It has been acquired by several Universities.



Alpha Spectrometer



Multi Channel Analyzer

Training Programs

We also conducted teacher training programs at IUAC every six months and One Day Workshops at various colleges and universities. Last year the programs were conducted at Central University of Himachal Pradesh, Dharamshala, IIT Kanpur and IISER Tirupati.



Six days training program (3 to 8 October 2016) at IUAC

6.3 LIBRARY ACTIVITIES

Priyambada Nayak

Salient features

Working hours:	Round the clock, all days of the week
Total Books:	~2896 (broadly covering the subjects Nuclear Physics, Materials Science, Nanotechnology, Electronics, Computer Science, Radio- biology, Radiation Physics, Vacuum Instrumentation, Cryogenics, Atomic Physics, Mathematical Physics, Quantum Mechanics, Astrophysics etc.
Current E-Journals:	> 2500
Bound Journals:	~8500
Laboratory Reports:	~900 (from nearly 50 labs)
Reprints/Photocopies:	~700
Newsletters, House magazines etc.	50
Databooks, Manuals etc.:	~550
Ph.D. Thesis:	168
Clientele:	Apart from IUAC staff and students, the library is consulted by students, teaching and research staff from over 100 academic and research institutions in different parts of the country.

The technical reports and technical memos of various projects carried out at IUAC are also compiled and kept in the library for reference purpose. Web-based OPAC and library cataloging software package “KOHA” has been installed for the computerization of library documents. Apart from the online current journals, Journal archives are also being subscribed by the library. **“Turn-it-in”**, the originality check software is being used to prevent plagiarism. **“Web of Science”** is being subscribed by the library and used by the scholars for citation analysis and other purposes. The library is a member of UGC-INFONET Consortium and more than 2500 journals are being accessed on-line through these facilities. The library is open round the clock. Hence, automatic monitoring system has been installed.

6.4 ACADEMIC ACTIVITIES HELD IN 2016-17

4 April, 2016	Acquaintance Programme at Central University of Punjab, Bhatinda (Contact Person : Pankaj Kumar)
21-23 April, 2016	Workshop on Accelerator Mass Spectrometry (Contact Person : S. Chopra)
25-29 April, 2016	School on Experimental methods in Gamma Ray Spectroscopy (Contact Persons : S. Muralithar / R.P. Singh)
2-7 May, 2016	Training Program on Computer Interfaced Science Experiments (Contact Persons : Ajith Kumar B.P./V.V.V. Satyanarayana)
16-27 May, 2016	School on Accelerator Physics (Contact Person : R. Mehta)
1-28 June, 2016	Summer Programme for B. Sc. (Physics) Students (Contact Person : Subir Nath)
5-7 July, 2016	Users Workshop
8 July, 2016	60th AUC Meeting
8 August, 2016	PhD Programme : Fall Semester starts (Contact Persons : P. N. Prakash / P. Sugathan)
17, 19 & 22 August, 2016	IUAC Academic Workshop (Contact Person : P. Sugathan)
19 September, 2016	One-day Workshop on Isomer studies at the Focal Plane of HYRA (Contact Persons : Akhil Jhingan / Subir Nath)
22-27 September, 2016	International School on Ion Beams in Materials Science (Contact Person : A. Tripathi)
Sept. 28-Oct. 1, 2016	International Conference on Ion Beams in Materials Engineering and Characterizations (IBMEC) (Contact Person : A. Tripathi)
3-8 October, 2016	Training Program on Computer Interfaced Science Experiments (Contact Persons : Ajith Kumar B.P./V.V.V. Satyanarayana)

16-18 December, 2016	Users Workshop
19 December, 2016	Foundation Day Programme & 61st AUC Meeting
23 January, 2017	Ph.D Programme : Spring Semester starts (Contact Person : P.N. Prakash)
6-8 February, 2017	Workshop on RF System for Accelerators (Contact Person : Subhendu Ghosh)
15-16 February, 2017	IUAC Academic Workshop (Contact Person : P Sugathan)
18 February, 2017	One day Workshop in association with NASI-Delhi Chapter on Observing Nuclear Processes from Zeptosecond to Picosecond Time-Scale (Contact Person : N. Madhavan)
28 February, 2017	National Science Day (Contact Person : Indra Sulaniya)
6-7 March, 2017	IX International Workshop on Advanced Generation of THz and Compton X-Rays compact Electron Accelerators (Contact Person : Subhendu Ghosh)

6.5 FORTHCOMING EVENTS: 2017

7 April, 2017	Acquaintance Programme at Visva Bharati, Santiniketan (Contact Person : S. Muralithar)
10 April, 2017	Acquaintance Programme at Central University of Himachal Pradesh, Dharamshala (Contact Person : P. Sugathan)
1-6 May, 2017	Training Program on Computer Interfaced Science Experiments (Contact Persons : Ajith Kumar B.P. / V.V.V.Satyanarayana)
5-30 June, 2017	Summer Programme for B.Sc. (Physics) Students (Contact Person : Subir Nath)
5-7 July, 2017	Users Workshop

8 July, 2017	62nd AUC Meeting
7-11 August, 2017	Workshop on Instrumentation & Control using Open Technologies (Contact Person: Ajith Kumar B.P.)
16-18 August, 2017	IUAC Academic Workshop (Contact Person : P. Sugathan)
21 August, 2017	Ph.D Programme : Fall Semester starts (Contact Person : P.N. Prakash)
4-9 September, 2017	School on Characterization of Materials (Contact Persons : K. Asokan / Fouran Singh)
11 September, 2017	Acquaintance Programme at Karnatak University, Dharwad (Contact Person : N. Madhavan)
14-15 September, 2017	Workshop on INGA Experiments (Contact Person : S. Muralithar)
20-22 September, 2017	Workshop on Superconducting Radio Frequency Science & Technology (Contact Person : P.N. Prakash)
4-7 October, 2017	International Conference on Nanostructuring with Ion Beams (Contact Person : A. Tripathi)
9-14 October, 2017	Training Program on Computer Interfaced Science Experiments (Contact Persons : Ajith Kumar B.P. / V.V.V.Satyanarayana)
Oct.30-Nov 4, 2017	School on Nuclear Reactions (Contact Persons : Akhil Jhingan /Subir Nath)
10 November, 2017	Acquaintance Programme at Savitribai Phule Pune University, Pune (Contact Person : Fouran Singh)
16-17 November, 2017	Workshop on Geochronology (Contact Person : S. Chopra)
16-18 December, 2017	Users Workshop
19 December, 2017	Foundation Day Programme & 63rd AUC Meeting

6.6 LIST OF PH.D AWARDEES

The following persons have been awarded Ph.D degree from Jawaharlal Nehru University during 2016-17

- **Subodh Kumar Gautam:** Study of metal-semiconductor nano-composites and their modifications by energetic ions for optoelectronic applications
- **Manju Bala:** Nanostructuring and Ion Beam Engineering of Thermoelectric Materials: PbTe & CoSb₃
- **Sarvesh Kumar:** Heavy Ion Beam Dynamics

6.7 LIST OF PUBLICATIONS IN THE YEAR 2016-17

A. NUCLEAR PHYSICS

1. **g-factor and quadrupole moment of the $(21/2)^-$ isomeric state in ^{131}La : Signature for a weakly-deformed magnetic rotational band head**, Jasmeet Kaur, Neeraj Bansal, A. K. Bhati, R. Kumar, Vijay R. Sharma, K. Kapoor, V. Kuamr, Navneet Kaur, *Phys. Lett. B* **765**, 317 (2017).
2. **Fusion and quasifission studies in reactions forming Rn via evaporation residue measurements**, A. Shamlath, E. Prasad, N. Madhavan, P. V. Laveen, J. Gehlot, A. K. Nasirov, G. Giardina, G. Mandaglio, S. Nath, Tathagata Banerjee, A. M. Vinodkumar, M. Shareef, A. Jhingan, T. Varughese, DVGRKS Kumar, P. Sandya Devi, Khushboo, P. Jisha, Neeraj Kumar, M. M. Hosamani, and S. Kailas, *Phys. Rev. C* **95**, 034610 (2017).
3. **Investigating prolate-oblate shape inversion in Pt nuclei near $A \sim 188^*$** , S. K. Chamoli, A. Rohilla, C. K. Gupta, R. P. Singh, S. Muralithar, S. Chakraborty, H. P. Sharma, A. Kumar, I. M. Govil, and D. C. Biswas, *Acta. Phys. Pol. B* **48**, 337 (2017).
4. **Spin distributions and cross sections of evaporation residues in the $^{28}\text{Si}+^{176}\text{Yb}$ reaction**, K. Sudarshan, R. Tripathi, S. Sodaye, S. K. Sharma, P. K. Pujari, J. Gehlot, N. Madhavan, S. Nath, G. Mohanto, I. Mukul, A. Jhingan, and I. Mazumdar, *Phys. Rev. C* **95**, 024604 (2017).
5. **Extending the application of DSAM to atypical stopping media**, S. Das, S. Samanta, R. Bhattacharjee, R. Raut, S. S. Ghugre, A. K. Sinha, U. Garg, R. Chakrabarti, S. Mukhopadhyay, A. Dhal, M. Kumar Raju, N. Madhavan, S. Muralithar, R. P. Singh, K. Suryanarayana, P. V. Madhusudhana Rao, R. Palit, S. Saha, and J. Sethi, *Nucl. Instrum. Meth A* **841**, 17 (2017).
6. **Breakup effects on alpha spectroscopic factors of ^{16}O** , S. Adhikari, C. Basu, P. Sugathan, A. Jhingan, B. R. Behera, N. Saneesh, G. Kaur, M. Thakur, R. Mahajan, R. Dubey, and A. K. Mitra, *J. Phys. G: Nucl. Part. Phys.* **44**, 015102 (2017).
7. **High spin g-ray spectroscopy in ^{41}Ca** , R. Bhattacharjee, S. Samanta, S. Das, S. S. Bhattacharjee, R. Raut, S. S. Ghugre, A. K. Sinha, U. Garg, R. Chakrabarti, S. Mukhopadhyay, A. Dhal, R. P. Singh, N. Madhavan, and S. Muralithar, *Phys. Rev. C* **94**, 054312 (2016).
8. **Mass, total kinetic energy, and neutron multiplicity correlations in the binary fragmentation of $^{50}\text{Ti}+^{208}\text{Pb}$ at 294 MeV bombarding energy**, S. Appannababu, M. Cinausero, T. Marchi, F. Gramegna, G. Prete, J. Bermudez, D. Fabris, G. Collazuol, A. Saxena, B. K. Nayak, S. Kailas, M. Bruno, L. Morelli, N. Gelli, S. Piantelli, G. Pasquali, S. Barlini, S. Valdré, E. Vardaci, L. Sajo-Bohus, M. Degerlier, A. Jhingan, B. R. Behera, and V. L. Kravchuk, *Phys. Rev. C* **94**, 044618 (2016).

9. **Precompound emission in low-energy heavy-ion interactions from recoil range and spin distributions of heavy residues: A new experimental method**, Manoj Kumar Sharma, Pushpendra P. Singh, Vijay Raj Sharma, Mohd. Shuaib, Devendra P. Singh, Abhishek Yadav, Unnati, R. Kumar, B. P. Singh, and R. Prasad, *Phys. Rev. C* **94**, 044617 (2016).
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11. **Effect of coupling in the $^{28}\text{Si}+^{154}\text{Sm}$ reaction studied by quasi-elastic scattering**, Gurpreet Kaur, B. R. Behera, A. Jhingan, B. K. Nayak, R. Dubey, Priya Sharma, Meenu Thakur, Ruchi Mahajan, N. Saneesh, Tathagata Banerjee, Khushboo, A. Kumar, S. Mandal, A. Saxena, P. Sugathan, and N. Rowley, *Phys. Rev. C* **94**, 034613 (2016).
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16. **Lifetime measurements in the yrast band of the gamma-soft nuclei ^{131}Ce and ^{133}Pr** , R. P. Singh, P. Joshi, S. K. Chamoli, S. Muralithar, G. Mukherjee, R. K. Bhowmik, and S. C. Pancholi, *Pramana – J. Phys.* **87**, 7 (2016).
17. **Fission dynamics study in ^{243}Am and ^{254}Fm** , K. Banerjee, T. K. Ghosh, P. Roy, S. Bhattacharya, A. Chaudhuri, C. Bhattacharya, R. Pandey, S. Kundu, G. Mukherjee, T. K. Rana, J. K. Meena, G. Mohanto, R. Dubey, N. Saneesh, P. Sugathan, R. Guin, S. Das, and P. Bhattacharya, *Phys. Rev. C* **93**, 064602 (2016).
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19. **Probing dynamics of fusion reactions through cross-section and spin distribution measurement**, Maninder Kaur, 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, *EPJ Web of Conferences* **117**, 08026 (2016).

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23. **Competition between the compound and the pre-compound emission processes in α -induced reactions at near astrophysical energy to well above it**, Manoj Kumar Sharma, Vijay Raj Sharma, Abhishek Yadav, Pushpendra P Singh, B. P. Singh, and R. Prasad, *Journal of Physics: Conference Series* **703**, 012025 (2016).

B. MATERIALS SCIENCE

1. **A comparative study on electrical and optical properties of group III (Al, Ga, In) doped ZnO**, B. Paul, B. Singh, S. Ghosh, and A. Roy, *Thin Solid Films* **603**, 21 (2016).
2. **A comparative study on the influence of 150 MeV Ni^{7+} , 120 MeV Ag^{9+} , and 110 MeV Au^{8+} swift heavy ions on the structural and thermoluminescence properties of $\text{Y}_2\text{O}_3: \text{Eu}^{3+}/\text{Tb}^{3+}$ nanophosphor for dosimetric applications**, S. Som, S. Das, S. Dutta, M. K. Pandey, R. K. Dubey, H. G. Visser, S. K. Sharma, and S. P. Lochab, *J. Mater. Sci.* **51**, 1278 (2016).
3. **A highly sensitive $\text{CaF}_2:\text{Dy}$ nanophosphor as an efficient low energy ion dosimetry**, M. S. Bhadane, K. Hareesh, S. S. Dahiwal, K. R. Sature, B. J. Patil, K. Asokan, D. Kanjilal, V. N. Bhoraskar, and S. D. Dhole, *Nucl. Instrum. Methods Phys. Res. Sect. B-Beam Interact. Mater. Atoms* **386**, 61 (2016).
4. **A study on 100 MeV O^{7+} irradiated $\text{SnO}_2/\text{Ag}/\text{SnO}_2$ multilayer as transparent electrode for flat panel display application**, V. Sharma, S. Singh, K. Asokan, and K. Sachdev, *Nucl. Instrum. Methods Phys. Res. Sect. B-Beam Interact. Mater. Atoms* **379**, 141 (2016).
5. **A study on the effect of low energy ion beam irradiation on Au/TiO_2 system for its application in photoelectrochemical splitting of water**, A. Verma, A. Srivastav, D. Sharma, A. Banerjee, S. Sharma, V. R. Satsangi, R. Shrivastav, D. K. Avasthi, and S. Dass, *Nucl. Instrum. Methods Phys. Res. Sect. B-Beam Interact. Mater. Atoms* **379**, 255 (2016).
6. **Anomalous behavior in temporal evolution of ripple wavelength under medium energy Ar^{+} -ion bombardment on Si: A case of initial wavelength selection**, S. K. Garg, R. Cuerno, D. Kanjilal, and T. Som, *J. Appl. Phys.* **119**, 7, 225301 (2016).
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8. **Au-C allotrope nano-composite films at extreme conditions generated by intense ultra-short laser**, S. A. Khan, K. Saravanan, M. Tayyab, S. Bagchi, and D. K. Avasthi, *Nucl. Instrum. Methods Phys. Res. Sect. B-Beam Interact. Mater. Atoms* **379**, 28 (2016).

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10. **Band gap engineering and low temperature transport phenomenon in highly conducting antimony doped tin oxide thin films**, M. P. S. Rana, F. Singh, S. Negi, S. K. Gautam, R. G. Singh, and R. C. Ramola, *Ceram. Int.* **42**, 5932 (2016).
11. **Band gap widening and narrowing in Cu-doped ZnO thin films**, K. Joshi, M. Rawat, S. K. Gautam, R. G. Singh, R. C. Ramola, and F. Singh, *J. Alloy. Compd.* **680**, 252 (2016).
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16. **Characterization of microstructure, viscoelasticity, heterogeneity and ergodicity in pectin-laponite-CTAB-calcium nanocomposite hydrogels**, N. Joshi, K. Rawat, and H. B. Bohidar, *Carbohydr. Polym.* **136**, 242 (2016).
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21. **Conduction mechanism in mesoporous hematite thin films using low temperature electrical measurements and theoretical electronic band structure calculations**, M. Chakraborty, A. Ghosh, R. Thangavel, and K. Asokan, *J. Alloy. Compd.* **664**, 682 (2016).
22. **CuInGaSe nanocrystals for detection of trace amount of water in D₂O (at ppm level)**, I. A. Mir, K. Rawat, and H. B. Bohidar, *Cryst. Res. Technol.* **51**, 561 (2016).
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34. **Effect of ion beam parameters on engineering of nanoscale voids and their stability under post-growth annealing**, S. Hooda, S. A. Khan, B. Satpati, D. Stange, D. Buca, M. Bala, C. Pannu, D. Kanjilal, and D. Kabiraj, *Appl. Phys. A-Mater. Sci. Process.* **122**, 7, Unsp 227 (2016).
35. **Effect of ion irradiation on nanoscale TiS₂ systems with suppressed Titania phase**, J. H. Saurabh, M. Dambarudhar, A. Tripathi, and D. Kanjilal, *Journal of Physics: Conference Series* **765**, 012007 (2016).
36. **Effect of ion velocity on SHI-induced mixing in Ti/Bi system**, N. Bansal, S. Kumar, S. A. Khan, and R. S. Chauhan, *Radiat. Eff. Defects Solids* **171**, 290 (2016).
37. **Effect of post sputter annealing treatment on nano-structured cadmium zinc oxide thin films**, A. G. Kumar, T. S. Sarmash, D. J. Rani, L. Obulapathi, G. Rao, T. S. Rao, and K. Asokan, *J. Alloy. Compd.* **665**, 86 (2016).
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C. OTHERS

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6.8 LIST OF SEMINARS CONDUCTED IN THE YEAR 2016-17

S.No.	Date	Title	Name & Affiliation
1.	05/04/2016	ION Implamters	Dr. Cyrille Gosset, Ion Beam Service France
2.	11/04/2016	Undulator Development Activities at Devi Ahilya Vishwavidyalaya, Indore	Prof. G. Mishra (DAVV) Indore
3	12/05/2016	Synthesis, modification and Characterization of Semi-conductor Nanostructures – ION Beams/Gamma Irradiation and Laser Ablation	Prof. Anand P. Pathak, University of Hyderabad, Hyderabad
4.	16/09/2016	Nanoscale pyrochlore materials for the immobilization of the radioactive waste	Dr. Pawan Kumar Kulriya, IUAC
5.	04/07/2016	Single Crystals from Fundamental Applications to Wide Applications	Prof. Krishan Lal, former President Indian National Science Academy, New Delhi
6.	06/10/2016	Python Programming Language for Learning Science	Dr. Ajith B.P., IUAC
7.	06/10/2016	Terahertz generation and detection from Carbon irradiated GaAs and improved antenna designs.	Dr. Abhishek Singh, HZDR, Dresden, Germany
8.	26/10/2016	Cryogenic System for International Linear Collider (ILC) and R&D Activities on ILC Cryogenics at KEK	Prof. Hirotaka Nakai, Head Accelerator Cryogenics, KEK
9.	07/11/2016	Rejuvenating Thermoelectricity	Dr. Gunadhor S. Okram UGC-DAE Consortium for Scientific Research, Indore, M.P.
10.	08/11/2016	The Physics behind the smart cut TM Process	Prof. A. Claverie, CEMES-CNRS and University of Toulouse France
11.	13/11/2016	Out of the box design for molecularly tailored inorganic nano materials and interfaces.	Prof. Dr. Ganapati Ramanath, John Tod Horton Professor of Material Science and Engineering, Rensselaer, Polytechnic Institute, New York, USA
12.	17/02/2017	Beam optics simulation of Delhi Light Source, IUAC in collaboration with HZDR	Mr. Joydeep Karmakar, IUAC
13.	23/02/2017	Irradiation effects of MeV C60-cluster ions on SiO2 and embedded metal nanoparticles.	Dr. Hiroshi Amekura, National Institute for Materials Science (NIMS) Tsukuba, Japan
14.	27/02/2017	Contributions of five titans to the education and research in pre and post independent India: A personal perspective.	Dr. A.K. Grover, Vice Chancellor Panjab University, Chandigarh.

6.9 SCHOOLS, WORKSHOPS, ACQUAINTANCE PROGRAMMES, FOUNDATION DAY & NATIONAL SCIENCE DAY CELEBRATIONS

School on Accelerator Science and Technology- 2016 (SAST-2016)

Rajeev Mehta

Inter-University Accelerator Centre (IUAC) hosted a School on Accelerator Science & Technology during May 16-28, 2016 under the sponsorship of Department of Science & Technology (DST). This school was second in the series of DST sponsored accelerator school. The aim of the school was to provide educational opportunities for young scientists, engineers, faculty members, post-doctoral fellows and research scholars in this important and advanced field of research and development (R&D) and to encourage them to contribute effectively in this challenging area of R&D. The program consisted of intensive lectures, tutorials and hands on experiments on the wide range of technologies that form the base of the particle accelerator technology.

This school gave an overview and status of the existing accelerator system and also explored the possibilities of the upcoming facilities. The school covered basic physics and technologies related to the accelerators. Series of lectures were delivered by experts from various prestigious accelerator based research institutes in India. There were interactive classroom tutorial sessions, special review talks by eminent scientists and engineers on some of the advance topics related to the accelerators. During hands-on experiments session participants were exposed to some of the technologies and equipment related to accelerators. The school was offered to graduate, postgraduate students, junior researchers and young scientists etc. from all over the India who are highly motivated to pursue their carrier in accelerator science and technology.

Topics were Basics of Accelerators, Electrostatic, Circular and RF Accelerators, Charged particle Optics, Space Charge, Ion Source, New Acceleration Techniques, Applications of Accelerators, Power Supplies, Magnet Technology, Vacuum Technology, Diagnostic Devices, Basics of Cryogenic and its Applications to Accelerators, Radiation Safety etc. The school duration was two weeks starting from 16 May 2016. The program had intensive lectures, tutorials and hands on experiments on the wide range of technologies that form the base of the particle accelerator technology. School covered the areas like Beam Dynamics, RF Accelerator (Linear & Circular), Operational Aspect of Accelerator, Ion Sources, Vacuum, Instrumentations, High Power Devices, Radiation Safety etc. The overall program had 65 sessions

- 36 Lectures
- 12 Special Review Talks and talks on major Indian projects
- 9 Tutorials
- 4 Hands on Experiments of 2 hours each (total 8 sessions)

This provided an extremely useful opportunity to the participants to explore how they can contribute to this expending R&D area. Participant's feedback on this was very encouraging. "Hands on Experiments" was another feature that gave the participants an exposure to some of the technologies of accelerator physics. Interactive tutorial sessions were held, where participants were divided into four groups and were asked to solve the problem on the board. Marking system was introduced and the winner group was facilitated in the concluding session.



SAST-2016 Moments Captured in Camera



Prof. H. Devraj and Dr. D. Kanjilal with participants of SAST-2016

School on Experimental techniques in gamma ray spectroscopy

S. Muralithar and R.P.Singh

A five day school on 'Experimental techniques in gamma ray spectroscopy' was held at our Center from 25th to 29th April in 2016. About 30 Ph.D. Students from different universities and national institutes attended this school. The talks covered range of topics in gamma ray spectroscopy by experts in the field. About ten faculties from different institutes gave lectures in this school. The topics covered in this school ranged from basic techniques in gamma ray spectroscopy, lifetime measurements, g-factor measurement techniques and gamma ray tracking. The school was organized before the onset of second Indian National Gamma Array (INGA) campaign at IUAC to benefit young researchers.

International School on Ion Beams in Materials Science

A. Tripathi

An International school on ion Beams in Materials Science from September 22-27, 2017 preceded the IBMEC2016 conference. There were 21 lectures on 12 topics on ion beam interaction, its applications in advanced fields such as in nanostructuring, biological systems, magnetic and superconducting systems, resistive switching, etc. The lectures on various characterization techniques such as SEM, TEM, EELS, XRD, MOKE, SAXS etc were also included. There were demonstrations on simulation softwares such as SRIM, TRIM, RUMP, SIMNRA along with hands on experience for their use.



Photograph of RBS demonstration during school

IUAC-NASI Workshop at IUAC

A workshop titled “Observing nuclear processes from Zeptosecond to picosecond time-scale” was jointly organized by Inter-University Accelerator Centre and National Academy of Sciences, India – Delhi Chapter, on February 18, 2017, to introduce charged particle accelerators, nuclear experimental facilities and the experimental research carried out at IUAC, New Delhi. The participants, nearly seventy and nominated by the respective institutions, were mainly B.Sc./M.Sc. (and a few B. Tech./M. Tech.) students accompanied by faculty from colleges/institutes in and around Delhi.



Group Photos of IUAC-NASI workshop at IUAC.



Facility visit during IUAC-NASI workshop at IUAC

The morning session of the one-day workshop, consisted of talks delivered by Prof. Ajoy Ghatak, Chairman, NASI - Delhi Chapter, Dr. Amit Roy, Raja Ramanna Fellow, VECC and Ex-Director, IUAC, Dr. D. Kanjilal, Director, IUAC and Dr. N. Madhavan, Scientist-H and Programme leader, Nuclear Physics Group, IUAC. The post-lunch session consisted of visit to IUAC accelerator and nuclear physics facilities, a demonstration experiment on Rutherford Back Scattering using 1.7 MV Tandem Van de Graaff accelerator and visit to AMS facility. An open house quiz was conducted on the day's academic activities. Prof. Manju Sharma, Ex-President, NASI and Former Secretary, Government of India motivated the students with a talk addressing the career possibilities in science and distributed the prizes to the winners of the quiz. The presence of special invitees Prof. B. Buti, President, Buti Foundation and Prof. G. K. Mehta, Ex-Director, IUAC inspired the students further.

Workshop on Accelerator Mass Spectrometry at IUAC

A workshop on Accelerator Mass Spectrometry (AMS) was organized at IUAC during 21-23 April, 2016, with the objective to impart the knowledge about chronometric aspects of AMS with lectures and discussion on its principles, sample collection, sample processing including chemical pretreatment methods, measurement protocols, data analysis protocols and software including geometry and other corrections and their varied applications in earth and planetary sciences. Three subject experts, Prof. Tibor Dunai from Institute for geology and mineralogy, University of Cologne, Germany, Prof. Kieth Fifield from Department of Nuclear Physics, Australian National University, Canberra, Australia and Prof. A.J. T. Jull, from AMS laboratory, University of Arizona, Tuscan USA, were invited to deliver the lectures on above mentioned topics.

Prof. G. K. Mehta, Former Director, IUAC delivered evening talk on “Nuclear Accelerators –Path finders” on first day of the workshop.

Three other speakers namely Prof. S. Lahiri from Saha Institute of Nuclear Physics, Kolkata, Dr. J.K. Pattanaik from Central University of Punjab, Bathinda, Punjab and Dr. Pankaj Kumar from IUAC New Delhi also

delivered talks upon the research activities carried out using existing AMS facility at IUAC. A visit to the AMS facility was also organized to all the participants. Workshop was attended by 125 participants comprising young faculties Post-doctorate and PhD scholars, from different parts of the country.

The workshop was inaugurated by Dr. S. Nayak, Former secretary Ministry of Earth Sciences and he discussed on the “Perspectives for Geosciences in India



Inaugural address by Dr. S. Nayak
former Secretary Ministry of Earth Sciences, Govt of India



Prof. Keith Fifield – talk on Principle of AMS
and specialized applications

Workshop on RF systems for Accelerators (Feb. 06-08, 2017) at IUAC

(Sponsored By Department of Science and Technology)

With the help of the funds sanctioned by Department of Science and Technology (DST), New Delhi to Inter University Accelerator Centre (IUAC), New Delhi (Order No. SR/MF/Z-06/2012), one national level workshop on “RF systems for Accelerators” was organized at IUAC during the period of 06-08 February, 2017.

In this workshop, it was intended to invite the young personnel from various institutions and universities who are working in the field of RF systems related to accelerators. Speakers of the workshop were selected from various institutions and all of them are working at senior level positions and have got a vast experience in the field of Radiofrequency and associated systems. In this workshop, 38 participants and 11 speakers from different parts of India had participated. A total of 11 lectures and 6 tutorial sessions each of one hour duration, a short lab tour and 2 evening lectures were arranged during the workshop. In addition to the external participants, the IUAC personnel who are working in the field of RF electronics and associated systems also participated in the workshop. The duration of the workshop was kept for three days and the program schedule was packed with lectures, tutorials and evening lectures from 09:00 a.m to 07:30 p.m. During the workshop, intense interaction between the young participants and the lecturers took place and as a result this workshop became very beneficial for the young Indian community who are working in the field of RF systems for Accelerators.



Workshop on RF systems for Accelerators in progress



Group photograph of workshop on RF systems for Accelerators

Ion Beams in Materials Engineering and Characterization (IBMEC 2016)

A. Tripathi

Ion Beams in Materials Engineering and Characterization (IBMEC 2016) conference was hosted by Inter University Accelerator Centre along with Ion Beam Society of India (IBSI) in IUAC from 28th September to 1st October 2016. The conference was the continuation of SHIMEC (Swift Heavy Ions in Materials Engineering and Characterization) conference series being organized at IUAC but its scope has been widened to include the regime of low energy ions also. The conference had 17 invited, 19 oral and 74 poster contributions. The inaugural talk was given by Prof. T. Venkatesan from NUS, Singapore. To encourage young research scholars best oral presentation award was given to Ms Merry Gupta (SLEIT, Longowal) and best poster presentation awards jointly to Ms. Sonu Hooda (IUAC, New Delhi) and Mr. S. Dhal (NISER, Bhubneswar).



Dr. D.K. Avasthi addressing the gathering



Invited talk in the conference

IX International Workshop on Advanced Generation of THz and Compton X-rays (AGTaX) using compact electron accelerator (March 06-07, 2017) at IUAC

The International workshop was focussed on the generation and characterization of THz and X-ray radiation from ultra-short single train of femtosecond bunches of relativistic electrons, applications of generated high-brightness coherent THz beams, interaction of charged particle beams with artificial structure etc. The workshop intended to bring together different communities working on the simulation, generation and experimental investigation of high brightness THz and Compton X-rays beams. The event was jointly organized by Inter

University Accelerator Center, New Delhi, High Energy Accelerator Research Organization (KEK), Japan and University of Oxford, UK. There were about 20 foreign and 40 Indian participants attended the two days' workshop. A few pictures of the workshop are shown below.



Dr. Ghosh welcomes the participants



Group photograph of AGTaX

IUAC Acquaintance program at Central University of Punjab, Bathinda on April 4, 2016

Jitendra Kumar Pattanaik, Pankaj Kumar

Centre for Geography and Geology in collaboration with Centre for Physical Sciences at Central University of Punjab (CUPB) organised one day acquaintance program for providing the awareness about facilities available at Inter University Accelerator Centre, New Delhi (an autonomous research centre of UGC) and research opportunities in the field of Accelerator Mass Spectrometry, Materials Science, Nuclear Physics, Atomic and Molecular Physics, Radiation biology and other allied interdisciplinary areas on 4th April, 2016. To organize this program Dr. Jitendra Kumar Pattanaik, Assistant Professor, Centre for geography and Geology submitted this proposal to the IUAC, New Delhi and subsequently proposal got accepted. This program was funded by the IUAC, New Delhi, and Rs. 40, 000/- was sanctioned for organising this program.

The schedule of the program was consisting of one inaugural session and three technical sessions. Two resource persons from IUAC, New Delhi was present for this program. Total 103 participants were attended the program. Among them 23 faculty members of CUPB, 10 out station participants, and 70 research scholar and students of CUPB were present for this program. At the end of the program feedback was collected from the participants and participation certificates were given to all the participants.

The programme commenced with formal registration and an inaugural session. This session was convened by the convenor, Dr. Jitendra Kumar Pattanaik. After welcome, introduction of resource persons and objective of the program was briefed by the convenor. Prof. P.Ramarao, Dean Academic Affairs delivered the inaugural address. The first technical session began with a talk by Dr. Pankaj Kumar, Scientist, IUAC on the scope and facility at IUAC, New Delhi. He described in detail the working and uses of various types of accelerators present at IUAC such as 15UD pelletron accelerators, superconducting LINAC, and various other accelerator systems. He discussed about first and only operating AMS facility at IUAC. Dr. Saif A. Khan, Scientist, IUAC described the various types of research work carried out at IUAC by ion beam modifications such as nanomaterials synthesis by sputtering, ion beam mixing, alloy formation, SHI induced recrystallization of Si_3N_4 layer, formation of nanocomposites, grain growth in irradiated thin films, size reduction effects in TiO_2 , phase separation, magnetic measurements of magnetic materials, various types of materials studied, effect of SHI irradiation in polymers, various others area of reassert such as ripening formation at SiC surface by changing fluency, annealing effect. The second technical Session focussed on material science research at CUPB. The third technical session was based on the Earth Science Research at CUPB. The technical sessions were followed by a feedback session during which the participants raised pertinent issues and queries for discussion. The programme concluded with a summery note and formal vote of thanks delivered by Dr. Kamlesh Yadav.



Participants of acquaintance program of IUAC, New Delhi, at Central University of Punjab, Bathinda

IUAC FOUNDATION DAY

The 27th Foundation Day of IUAC was celebrated on December 19, 2016. Prof. Ashutosh Sharma, Secretary, Department of Science & Technology, Govt. of India, delivered the Foundation Day Lecture titled “Science, Technology and Innovation: Closing the Circle”. Apart from several dignitaries, users, PhD scholars and IUAC staff members, science students of Class-XI from around 15 neighboring schools (4 students from each school accompanied by their physics teacher), attended the foundation day lecture. In the post lunch session, the students attended another lecture to learn why particle accelerators are needed for research. They also saw several demonstration experiments and were given a tour to show some of the accelerators and experimental facilities at IUAC.



Prof. Ashutosh Sharma delivering the 27th Foundation Day Lecture titled “Science, Technology and Innovation: Closing the Circle”.



Dr D. Kanjilal and Prof. Ashutosh Sharma interact with some school students during the 27th Foundation Day function.



School students seeing the demonstration of the charging of a Van de Graff generator.



School students seeing the nuclear physics experimental facilities Indian National Gamma Array (INGA) and Hybrid Recoil Mass Analyzer (HYRA).

NATIONAL SCIENCE DAY 2017



Dr. Kanjilal welcoming Prof. A. Ghatak



Group photo of the participants of National Science Day 2017

The National Science Day programme is celebrated in India each year to mark the discovery of the 'Raman Effect' by eminent Indian Physicist Sir Dr. C. V. Raman on 28th February 1928. He was awarded with the Nobel Prize in Physics for his discovery in the year 1930.

This year, the National Science Day Programme was organized by Dr. Indra Sulania, Scientist, IUAC, New Delhi, with the support of many young brains. B.Sc., IInd and IIIrd year's students from various colleges of University of Delhi and JamiaMilliaIslamia were invited to participate in the event. The letters were sent to about 28 colleges from University of Delhi, JamiaMilliaIslamia and Amity University.

About 81 participants participated in the event from different colleges from University of Delhi and 20 from our own Institute. The main highlights of the programme are:

- There was an invited talk by Prof. Ajoy Ghatak, Retd. From IIT Delhi, present Chairman of NASI Programme, on Fiber optics.
- The 'research highlights at IUAC' was presented by Dr. N Madhavan, IUAC.
- A talk on 'Pelletron Accelerator' was delivered by Mr. Sunil Ojha, IUAC.
- A science quiz was also organized to make the programme more interactive with the students by Dr. S A Khan And Dr. Indra Sulania.
- Visits to various facilities was also arranged to give them the exposure of the facilities we have at IUAC such as Ion source, various beam lines, XRD and NAND setup etc. with the support from scientific staff and students of IUAC.
- Participation certificates and TA were distributed to all the participants at the end of the programme.

Observance of Vigilance Awareness Week, 2016 at IUAC

Vigilance Awareness Week was observed at IUAC from 31st October to 5th November, 2016. The theme for the Vigilance Awareness Week was "Public Participation in promoting integrity and eradicating Corruption".

The observance of the Vigilance Awareness Week at IUAC commenced with the pledge taken by the employees in the Seminar Hall on 31st October, 2016 at 11.00 A.M. An essay competition was organised on the topic "**Public Participation in promoting integrity and eradicating Corruption**". A banner showing observance of Vigilance Awareness Week was displayed at different locations in the office building and at the main entrance.

International Yoga Day Celebration

The Sports and Cultural Committee of IUAC organized a Yoga awareness camp to celebrate the International Yoga Day on June 21, 2016.





Yoga awareness camp on 21st June, 2016 at IUAC.

Independence Day and Republic Day Celebrations



Dr. D. Kanjilal, Director IUAC hoisting the National Flag.

The Independence Day was celebrated at IUAC by organizing competition among children on various topics like on the spot painting, elocution, acting and debate. Similarly, The Republic Day was also celebrated by organizing sports competition among the children and residents of the campus.

Annual Cultural Program

The annual cultural festival “SPANDAN” of IUAC for the year 2016 was organized by Sports & Cultural Committee on 5th November , 2016. About 70-80 children supported by the elders, participated in a function adorned by various regional dances, songs, instrumental music, mime show and drama.



Inauguration of the cultural festival ‘SPANDAN-2016’



Glimpses of the annual cultural program.