

## 6. ACADEMIC ACTIVITIES

### 6.1 PELLETRON BEAM UTILIZATION BY USERS

#### 6.1.1 Pelletron Beam Time Utilization and Experiments performed (April 2010 - March 2011)

Users	No. of shifts allotted	Projects in			
		Nuclear Physics	Materials Science	Radiation Biology	Atomic Phys. / AMS
<b>A. Universities / Colleges</b>					
Agra University	4		2		
Allahabad University	3		1		
BHU, Varanasi	6		2		
Calicut University	8	1			
Delhi University	46	2	2		
GPant University	10		3		
GGSIIP University, N Delhi	6		2		
GNDU, Amritsar	8		4		
HNB University, Garhwal	2		1		
Hyderabad University	4		1		
Kalyani University, WB	2			1	
Karnataka University	9	1			
M M University, Ambala	2		1		
MSU, Vadodara	8		4		
Mumbai University	2		1		
Mysore University	4		2		
NM University, Jalgaon	2		1		
North Orissa University	3		1		
Periyar University	3		1		
Presidency Coll. Chennai	2		1		
Punjab University	67	2	1		2
Rajasthan University	2		1		
Tezpur University	7		2		
Utkal University	3		1		

Users	No. of shifts allotted	Projects in			
		Nuclear Physics	Materials Science	Radiation Biology	Atomic Phys. / AMS
<b>B. Institutions</b>					
BARC, Mumbai	11				1
Dayalbagh Inst., Agra	4		1		
IIT, Delhi	2		1		
IIT, Kharagpur	4		1		
IIT, Roorkee	5		2		
ISRO, Bangalore	7		1		
IUAC, New Delhi	38	1	6	1	
MANIT, Bhopal	2		1		
NIT, Raurkela	2		1		
NIT, Tiruchirapalli	2		1		
PRL, Ahmedabad	2				1
TIFR, Mumbai	18	1			
<b>C. Facility tests</b>		25			
<b>Total</b>	<b>335</b>	<b>8</b>	<b>50</b>	<b>2</b>	<b>4</b>

### 6.1.2 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 - (83)

- |   |                |
|---|----------------|
| 01. Acharya Nagarjuna University          | Andhra Pradesh |
| 02. Agra University (B.R. Ambedkar Univ.) | Agra           |
| 03. Aligarh Muslim University             | Aligarh        |
| 04. Allahabad University                  | Allahabad      |
| 05. Andhra University                     | Waltair        |
| 06. Anna University                       | Chennai        |
| 07. Assam University                      | Silchar        |
| 08. Banaras Hindu University              | Varanasi       |
| 09. Bangalore University                  | Bangalore      |

10. Berhampur University	Berhampur
11. Bhagalpur University	Bhagalpur
12. Bharathiar University	Coimbatore
13. Bharthidasan University	Tirucherapalli
14. Bhavnagar University	Bhavnagar
15. Bombay University	Mumbai
16. Burdwan University	Burdwan
17. Calcutta University	Kolkata
18. Calicut University	Calicut
19. Chaudhury Charan Singh University	Meerut
20. Cochin University	Cochin
21. Cochin University of Science & Technology	Cochin
22. Delhi University	Delhi
23. Devi Ahilya University	Indore
24. Dr. B.A.M. University	Aurangabad
25. G.B. Pant University	Pantnagar
26. Gauhati University	Guwahati
27. Gujarat University	Ahmedabad
28. Gulbarga University	Gulbarga
29. Guru Ghasidas University	Bilaspur
30. Guru Nanak Dev University	Amritsar
31. Himachal Pradesh University	Simla
32. HNB Garhwal University	Srinagar Garhwal
33. Hyderabad University	Hyderabad
34. Indra Prastha University (GGSIPU)	New Delhi
35. Indira Gandhi National Open University (IGNOU)	New Delhi
36. Jamia Milia Islamia University	New Delhi
37. Jammu University	Jammu
38. Jawaharlal Nehru University	New Delhi
39. Kalyani University	Kalyani
40. Karnataka University	Dharwad
41. Kashmir University	Srinagar
42. Kiel University	Germany
43. Kurukshetra University	Kurukshetra
44. Kuvempu University	Shankaraghatta, Shimoga

45. Lucknow University	Lucknow
46. Ludwig Maximillian University	Munich, Germany
47. M.D. University	Rohtak
48. M.L. Sukhadia University	Udaipur
49. M.S. University	Baroda
50. Madras University	Chennai
51. Mahatama Gandhi University	Kottayam
52. Mangalore University	Mangalore
53. Manipur University	Imphal
54. Mannonmaniam Sundaranagar University	Tirunelveli
55. M M University	Ambala
56. Mysore University	Mysore
57. Nagpur University	Nagpur
58. North Carolina State University	USA
59. North Eastern Hill University	Shillong
60. North Maharashtra University	Jalgaon
61. North Orissa University	Baripada
62. Osmania University	Hyderabad
63. Patna University	Patna
64. Periyar University	Kerala
65. Pondichery University	Pondichery
66. Poona University	Pune
67. Punjab Agricultural University	Ludhiana
68 Punjab University	Chandigarh
69. Punjabi University	Patiala
70. Rani Durgawati University	Jabalpur
71. S.K. University	Anantpur
72. Stuttgart University	Germany
73. Saurashtra University	Rajkot
74 Technical University	Darmstadt, Germany
75. Tezpur University	Tezpur
76. Shivaji University	Kolhapur
77. University of Maryland	Maryland, USA
78. University of Notre Dame	Notre Dame, USA
79. University of Rajasthan	Jaipur

80. Utkal University	Bhubaneswar
81. Vikram University	Ujjain
82. Vishwa Bharti University	Bolpur
83. West Bengal University of Technology	Kolkata

**(B) COLLEGES - (54)**

01. Anand Mohan College	Kolkata
02. Armed Forces Medical College	Pune
03. Bareilly College	Bareilly
04. Belonia College	Belonia, Tripura
05. Beant College of Eng. and Technology	Gurdaspur
06. Bharatiya Jain Sanghatana College	Pune
07. Bhiwandi College	Mumbai
08. BNN College	Bhivandi, Madhya Pradesh
09. CHM College	Ulhasnagar, Maharashtra
10. College of Engineering and Technology	Aligarh
11. DAV College	Mumbai
12. DAV College	Jalandhar
13. DAV College	Kanpur
14. DBS College	Dehradun
15. Doodhsakhar Mahavidyalaya	Bidri, Maharashtra
16. Ewing Christian College	Allahabad
17. Govt. Art College	Rajamundri, Andhra Pradesh
18. Govt. College	Ajmer
19. Govt. College	Mehendragarh
20. Govt. College	Kota
21. Govt. MSJ College	Bharatpur
22. Goyalpara College	Goyalpara, Assam
23. Gurudas College	Kolkata
24. Jai Hind College	Mumbai

25. Kandi Raj College	Murshidabad, (WB)
26. Kongunadu Arts & Science College	Coimbatore
27. Koshi College	Khagaria, Bihar
28. Mahila Degree College	Lucknow
29. Marwari College	Ranchi
30. M.M.H.College	Ghaziabad
31. MR College	Vizianagram (AP)
32. Malviya Regional Engg. College	Jaipur
33. Nayagarh College	Nayagarh
34. Nizam College	Hyderabad
35. NSAM College	Mangalore
36. Orissa Univ. of Agriculture & Tech.	Bhubneshwar
37. Poorna Prajna College	Udipi, Karnataka
38. Punjab Engineering College	Chandigarh
39. RBS College	Agra
40. RD & DJ College	Munger, Bihar
41. Regional Engineering College	Kurukshetra
42. RPG College	Ratnagiri
43. School of Physical Sciences	Nanded, Maharashtra
44. School of Tech. & Applied Sciences	Kottayam, Kerala
45. SDM College	Ujire, Mysore
46. Sharanabasaveshwar College of Science	Gulbarga
47. S.N.College	Kollam
48. Sri Bhuvanendra College	Karkala
49. St. Edmunds College	Shillong
50. S.V. College	Aligarh
51. Swami Shardhanand College	New Delhi
52. University College	Kurukshetra
53. University College of Science & Tech.	Kolkata
54. Vaish College	Rohtak

**(C) OTHER INSTITUTIONS – (63)**

01. AICTE	New Delhi
02. AIIMS	New Delhi
03. Amity School of Engineering	New Delhi
04. Bhabha Atomic Research Centre	Mumbai
05. C.E.E.R.I.	Pilani
06. CAT	Indore
07. CCMB	Hyderabad
08. Centre for Superconductivity research	USA
09. CSNSM, Orsay Cedex	France
10. D.M.R.L.	Hyderabad
11. Dayalbagh Educational Institute	Agra
12. Defence Laboratory	Jodhpur
13. Defence Research & Development Orgn.	Dehradun
14. Genetic Institute of Manufacturing Technology	Singapore
15. GSI	Germany
16. Harcourt Butler Technological Institute	Kanpur
17. ICGEB	New Delhi
18. IISER	Kolkata
19. I.G.C.A.R.	Kalpakkam
20. Indian Institute of Science	Bangalore
21. Indian Institute of Technology	Chennai
22. Indian Institute of Technology	Kanpur
23. Indian Institute of Technology	Kharagpur
24. Indian Institute of Technology	Mumbai
25. Indian Institute of Technology	New Delhi
26. Indian Institute of Technology	Roorkee
27. Indian Space Research Organisation	Bangalore
28. INFN-LEGNARO	Italy
29. INMAS	New Delhi
30. Institute of Basic Sciences	Agra

31. Institute of Materials Science	Bhubaneswar
32. Institute of Physics	Bhubaneswar
33. Institute of Science	Mumbai
34. IUC-DAEF, Calcutta Centre	Kolkata
35. IUC-DAEF, Indore Centre	Indore
36. Joint Inst. of Nuclear Research	Dubna, Russia
37. KIIT	Bhubaneswar
38. Massachusetts Inst. of Technology	USA
39. Malaviya National Institute of Technology	Jaipur
40. Maulana Azad National Inst. of Technology (MANIT)	Bhopal
41. Nanocrystals Technology	USA
42. National Institute of Materials Science	Japan
43. National Academy of Science	Allahabad
44. National Institute of Oceanography	Goa
45. National Institute of Technology	Kurukshetra
46. National Institute of Technology	Raurkela
47. National Institute of Technology	Silchar
48. National Institute of Technology	Srinagar
49. National Institute of Technology	Tiruchirapalli
50. National Physical Laboratory	New Delhi
51. NCCCM/BARC	Hyderabad
52. NCAOR	Goa
53. NCSR	France
54. NISER	Bhubaneswar
55. Oak Ridge National Laboratory	USA
56. Physical Research Laboratory	Ahmedabad
57. Saha Institute of Nuclear Physics	Kolkata
58. Sant Longowal Institute of Technology	Sangrur
59. SSPL	New Delhi
60. Tata Institute of Fundamental Research	Mumbai
61. Thapar Inst. Of Eng. & Technology	Patiala
62. VECC	Kolkata
63. Wadia Institute of Himalayan Geology	Dehradun



## 6.2 M. Sc. ORIENTATION PROGRAMME

N. Madhavan

M. Sc. Orientation programme is conducted by IUAC to encourage interested students to supplement their knowledge and to motivate them to continue their career in science. However, this programme is not conducted to satisfy the M. Sc. credit requirements of any university department. Due to large number of applicants every year than we can handle, we regret that all applicants may not be selected for project work. In order to provide chance for students from various universities, students from the same universities may be given less priority for consideration in successive years.

The two-week M. Sc. orientation programme has been providing hands-on training in fields associated with accelerator based research to selected M. Sc. students by way of short projects. Those M. Sc. students desirous of taking part in this programme may get their applications forwarded through their department giving the relevant details such as the marks in all the exams till date, broad field of interest and the period convenient to them. Efforts are made to give chance to students from various parts of the country.

## 6.3 LIBRARY

Priyambada Nayak

### *Salient features*

Working hours:	Round the clock, all days of the week
Total Books:	~2765 (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.
New Books added in 2010-11:	50
Current Journals:	52
Bound Journals:	~8000
Laboratory Reports:	~900 (from nearly 50 labs)
Reprints/Photocopies:	~700

Newsletters, House magazines etc.	50
Databooks, Manuals etc.:	~550
Ph.D. Thesis:	131
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 technicals 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 has been installed for the computerization of library documents. Apart from the print journals, online journals & archives are also being subscribed by the library. The library is a member of UGC-INFONET, INDEST-AICTE Consortium and more than 4000 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 THE PHD TEACHING PROGRAMME**

##### **A. Mandal**

The two semester Ph.D programme for research students of IUAC, outside university students and for new scientist trainees of IUAC continued to run well during this year. Overwhelming response from different universities shows the positive benefit of the programme to the community of students starting fresh research at different universities throughout the country. The programme consists of two semesters- one during January-May in which courses on Experimental Physics and Accelerator Physics are offered and the second one during August-December in which courses on Computers in instrumentation & data acquisition and advanced courses on Materials Science and Nuclear Physics are offered. Each course consists of five modules. Each module consists of 8 lectures of one and half hour duration and the credit awarded is 1.0. One course on Engineering Drawing is also offered as a part of the Experimental Physics to give basic understanding of drawing. About 20 students from different universities, colleges participated in each module. Several students from School of Physical Sciences, JNU attended the course on Experimental Physics.

Special lecture series on Nanomagnetism by Prof. H. Bernas from Orsay, France and Nuclear Model by Prof. Ameeya Bhagwat, IIT, Ahmedabad were also offered this year. A large number of students attended these special lecture series and they appreciated the subject contents and teaching.

One month before each semester, a poster containing details of the course is printed and circulated to physics department of various universities and colleges, inviting application for attending the courses. The programme is also put on our website. Accommodation and TA/DA are provided to the selected participants.

## 6.5 ACADEMIC ACTIVITIES IN 2010-11

April 22, 2010	Workshop on <b>Radiation Biology with Ion Beam</b> (Contact person : A.Sarma, IUAC)
April 27-28	Workshop on <b>High Performance Computing</b> (Contact person : S. Mookherjee, IUAC)
May 3-8	Workshop on <b>Innovative experiments</b> (Contact persons : B.P. Ajithkumar & K. Asokan, IUAC)
May 17	<b>Summer Programme</b> for B.Sc (Physics) Students (Contact person: A. Mandal, IUAC)
June 25	<b>Acquaintance Programme at Mysore</b> (Mysore University) (Contact person : Fouran Singh, IUAC)
July 6-7	<b>User Workshop:</b> Accelerator users' presentations
July 8	<b>48<sup>th</sup> AUC meeting</b>
August 3	Workshop on <b>Bio-Material with Ion Beam</b> (Contact person : D.K Avasthi, IUAC)
August 5	Ph.D programme, <b>Fall semester</b> starts
August 30-31	<b>IUAC Academic Workshop</b>
September 6- 11	Workshop on <b>Innovative experiments</b> (Contact persons : B.P. Ajithkumar & K. Asokan, IUAC)
September 15	Workshop on <b>AMS</b> (Contact person : S. Chopra, IUAC )
October 3	<b>Acquaintance Programme at Agartala</b> (Tripura University) (Contact person : D. Kabiraj, IUAC )
October 6-9	Workshop on <b>Swift Heavy Ions in Materials Engineering &amp; Characterization</b> (Contact person : A. Tripathi, IUAC)
November 12	<b>Acquaintance Programme at Lucknow</b> (Lucknow University) (Contact person : Saif A. Khan, IUAC)
December 17 -18	<b>User Workshop :</b> Accelerator users' presentations
December 19	<b>Foundation Day &amp; 49<sup>th</sup> AUC meeting</b>

January 19-20, 2011	<b>IUAC Alumni Meet</b> (Contact person : D.K Avasthi, IUAC)
January 21-22	Workshop on <b>Nuclear Physics with LINAC</b> (Contact persons : S. Muralithar, N.Madhavan, P.Sugathan, IUAC)
January 24	Ph.D programme, <b>Spring semester</b> starts
February 15-18	<b>DAE-BRNS Indian Particle Accelerator Conference (InPAC 2011)</b> (Contact person : D. Kanjilal, IUAC)
February 28	<b>National Science day</b> (Contact person : K. Asokan, IUAC)
March 8-9	<b>IUAC Academic Workshop</b>
March 25	<b>Acquaintance Programme at Kottayam</b> (Contact person : Ajith Kumar B.P., IUAC)

## 6.6 FORTHCOMING EVENTS: 2011

April 14-15	Meeting on <b>Mass Spectrometry in Health &amp; Environmental Sciences</b> (Contact person: S. Chopra, IUAC)
May 2-7	Workshop on <b>Innovative experiments</b> (Contact persons: B.P. Ajithkumar & K. Asokan, IUAC)
May 24-25	Workshop on <b>High Performance Computing</b> (Contact person: S. Mookherjee, IUAC)
June 14	<b>Acquaintance Programme at Simla</b> (Contact person: Fouran Singh, IUAC)
June 15	<b>Summer Programme</b> for B.Sc (Physics) Students (Contact person: A. Mandal, IUAC)
July 6-7	<b>User Workshop:</b> Accelerator users' presentations for beam time proposals
July 8	<b>50<sup>th</sup> AUC meeting</b>
August 8	Ph.D programme, <b>Fall semester</b> starts (Contact person: A. Mandal, IUAC)
September 12	Workshop on <b>AMS</b> (Contact persons: S. Chopra & Pankaj Kumar, IUAC)
September 16	<b>Acquaintance Programme at Baripada</b> (Contact person: D. Kabiraj, IUAC)
September 20-22	<b>IUAC Academic Workshop</b>

October 10-15	Workshop on <b>Innovative experiments</b> (Contact persons: B.P. Ajithkumar & K. Asokan, IUAC)
October 17-19	Workshop on <b>Nanostructuring by energetic ions</b> (Contact person: D.K. Avasthi, IUAC)
October 21-22	Workshop on <b>Atomic &amp; Molecular Physics and Materials science using LEIBF</b> (Contact Person : Praveen Kumar, IUAC)
November 14	<b>Acquaintance Programme at Nagpur</b> (Contact person: Saif A. Khan, IUAC)
November 16-18	<b>Asian Conference on Applied Superconductivity &amp; Cryogenics (ACASC 2011)</b> (Contact Person: T. S. Datta, IUAC)
November 21-25	School on <b>Radiation Biology</b> (Contact Person: A. Sarma, IUAC)
December 17-18	<b>User Workshop:</b> Accelerator users' presentations for beam time proposals
December 19	<b>Foundation Day &amp; 51<sup>st</sup> AUC meeting</b>

## 6.7 LIST OF SEMINARS CONDUCTED IN THE YEAR 2010-11

	<b>Date</b>	<b>Title</b>	<b>Name &amp; Affiliation</b>
01.	01-04-10	Nuclear Structure investigations using gamma-ray spectroscopy at UNILAC and SIS	Prof. Hans-Jurgen Wollersheim, GSI, Germany
02.	05-04-10	A double-sided silicon strip detector with excellent position, energy and time resolutions	Dr. Gregor Eleonara, GSI, Germany
03.	08-04-10	Halo world: The story according to Faddeev, Efimov and Fanp	Dr. Indranil Mazumdar, TIFR, Mumbai
04.	23-04-10	Time resolved imaging, spectroscopy and microscopy using ultrafast gated intensified CCD Cameras	Prof. Ramesh C Ahuja, Univ. of Goettingen, Germany
05.	04-06-10	Project X: A Multi MW Proton Accelerator at Fermilab	Dr. Jim Kerby, Fermi National Accelerator Laboratory, USA

06.	12-07-10	Emerging new Field of condensed matter nuclear science	Dr. Mahadeva Srinivasan, Physics Group, BARC
07.	28-07-10	Effects of ground hyperfine energy separation on quantum computation and frequency standard	Mr. Gopal Dixit, I.I.T., Kharagpur
08.	09-08-10	Porous silicon nanostructures and its application	Prof. V Agarwal, Centre of Engg. And Applied Science, Mexico
09.	27-08-10	Using DNA as a sensor of HG Nanoparticles	Dr. Shikha Verma, Instt. Of Physics, Bhubneswar
10.	24-09-10	Power converters: Why commercial world is betting on Gallium Nitride (GaN) to replace silicon	Dr. Satish Dhawan, Yale University
11.	25-10-10	Fabrication and characterization pf mamp devices for nanostructuring and field emiision application	Dr. R.T. Rajender Kumar, Bharthiyar University, Coimbatore
12.	15-11-10	Probing Local Electrical characteristics of surfaces by AFM	Dr. Yogita Batra, MESA+Instt. Of Nanotechnology, Univ. of Twente, The Netherlands
13.	16-11-10	Accelerator mass spectrometry, an unique technique in quite different fields of science: From the earth to the stars	Prof. G Korschinek, Fachbereich Physik, E15, Technische Universitat Munchen
14.	03-12-10	Matter under extreme conditions	Dr. B.K. Srivastava, DOP, Purdue University
15.	10-12-10	High current superconducting Linacs for Accelerator driven systems	Dr. Andrew Hutton, Jefferson Lab. Virginia
16.	10-12-10	From synchrocyclotron to large hadron collider(LHC)	Dr. Narendra Yamdagni, DOP at Stockholm University

17.	14-12-10	The structure of neutron rich nuclei studied by deep Inelastic reaction: Recent Results from LNL	Prof. G.de Anjelis, INFN, Italy
18.	29-12-10	Coherent X-ray diffraction imaging, Ptychography and beyond	Dr. Bipin B Dhal, Curtin University, Australia
19.	03-01-11	RHIC and ERHIC SRF Accelerator R&D	Dr. Iian Ben-zvi, Stony Brook University, USA
20.	05-01-11	Physics with the MSU high resolution array	Dr. Betty Tsang, MSU, USA
21.	13-01-11	Manipulation and measurement of phase transition and correlation in one dimensional optical lattice	Prof. Xuzong Chen, Peking University, Beijing, China
22.	27-01-11	Optical telescopes: an eye to universe since 1609	Prof. Ram Sagar, ARIES Laboratory, Nainital
23.	27-01-11	Spectroscopy of heavy elements at Dubna: Present and Future	Prof. Alexander Yerebin JINR, Dubna, Russia
24.	31-01-11	Damage buildup in semiconductors bombarded by small cluster ions	Prof. Andrei Titov, State Polytechnic University, Russia
25.	10-02-11	Feasibility of Transient Field Measurement	Dr. Sanjay Chamoli, Delhi University
26.	11-02-11	X-rays Diffraction studies of surface nanopatterns in-SIYU during ion erosion	European synchrotron radiation facility ESRF, rue J.Horowitz, Grenoble, France-38000
27.	23-02-11	The EXL Experiment @Fair and Plans with the ESR @ GSI	Prof. Nasser Kalantar-Nayestanaki, KVI University of Groningen, Netherlands
28.	14-03-11	Nuclear Incompressibility, Symmetry Energy and Neutron Stars	Prof. Umesh Garg, University of Notre Dame, USA
29.	29-03-11	Recent Advances in the Electronic and Magnetic Properties of Oxides and Oxide Interfaces	Prof. T Venkatesan, NUSNNI-NanoCore, NUS Singapore

## 6.8 LIST OF PUBLICATIONS (2010-2011)

### A. NUCLEAR PHYSICS

1. **Fission fragment mass distributions in reactions forming the  $^{213}\text{Fr}$  compound nucleus**, S. Appannababu, S. Mukherjee, B. K. Nayak, R. G. Thomas, P. Sugathan, A. Jhingan, E. Prasad, D. Negi, N. N. Deshmukh, P. K. Rath, N. L. Singh, and R. K. Choudhury, *Phys. Rev. C* 83, 034605 (2011).
2. **Evidence of quasifission in the  $^{16}\text{O} + ^{238}\text{U}$  reaction at sub-barrier energies**, K. Banerjee, T. K. Ghosh, S. Bhattacharya, C. Bhattacharya, S. Kundu, T. K. Rana, G. Mukherjee, J. K. Meena, J. Sadhukhan, S. Pal, P. Bhattacharya, K. S. Golda, P. Sugathan, and R. P. Singh, *Phys. Rev. C* 83, 024605 (2011).
3. **Conclusive evidence of quasi-fission in reactions forming the  $^{210}\text{Rn}$  compound nucleus**, E. Prasad, K. M. Varier, R. G. Thomas, P. Sugathan, A. Jhingan, N. Madhavan, B. R. S. Babu, Rohit Sandal, Sunil Kalkal, S. Appannababu, J. Gehlot, K. S. Golda, S. Nath, A. M. Vinodkumar, B. P. Ajith Kumar, B. V. John, Gayatri Mohanto, M. M. Musthafa, R. Singh, A. K. Sinha, and S. Kailas, *Phys. Rev. C* 81, 054608 (2010).
4. **Study of fission fragment mass distribution for  $^{16}\text{O} + ^{194}\text{Pt}$  reaction**, E. Prasad, K.M. Varier, B.R.S. Babu, N. Madhavan, K.S. Golda, S. Nath, B.P. Ajith Kumar, J.J. Das, J. Gehlot, P. Sugathan, A. Jhingan, A.K. Sinha, B.R. Behera, Rohit Sandal, Hardev Singh, R. Singh, R.G. Thomas, S. Kailas, *Nuclear Physics A*, 834, P 208c-211c(2010).
5. **Energy levels in  $^{141}\text{Nd}$  from fusion evaporation study**, S.Bhowal, C.Lahiri, R.Raut, P.Singh, M.K.Raju, A.Goswami, A.K.Singh, S.Bhattacharya, T.Bhattacharjee, G.Mukherjee, S.Bhattacharyya, S.Muralithar, R.K.Bhowmik, N.Madhavan, R.P.Singh, G.Gangopadhyay, *J.Phys.(London) G*38, 035105 (2011).
6. **Systematics of antimagnetic rotation in even-even Cd isotopes**, S.Roy, S.Chattopadhyay, P.Datta, S.Pal, S.Bhattacharya, R.K.Bhowmik, A.Goswami, H.C.Jain, R.Kumar, S.Muralithar, D.Negi, R.Palit, R.P.Singh, *Phys.Lett. B* 694, 322 (2011).
7. **Evidence of antimagnetic rotation in odd-A  $^{105}\text{Cd}$** , D.Choudhury, A.K.Jain, M.Patial, N.Gupta, P.Arumugam, A.Dhal, R.K.Sinha, L.Chaturvedi, P.K.Joshi, T.Trivedi, R.Palit, S.Kumar, R.Garg, S.Mandal, D.Negi, G.Mohanto, S.Muralithar, R.P.Singh, N.Madhavan, R.K.Bhowmik, S.C.Pancholi, *Phys.Rev. C* 82, 061308 (2010).
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### C. OTHERS

1. **Dissociation of Carbonyl Sulfide by 150 keV Ar<sup>+</sup> ions**, Jana M R, Ray B, Ghosh PN, Safvan C P., *Journal of Physics B: At Mol. Opt. Physics 43, 215207 (2010)*.
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## 6.9 LIST OF TECHNICAL REPORTS / TECHNICAL MEMOS (2010-11)

### A. List of Technical Reports

	<b>Title</b>	<b>Authors</b>	<b>Category</b>	<b>Reference No.</b>
01.	Chilled Water Hook-Up Piping system for Ph-II & Ph-III A/C Plants	A J Malyadri, Bishamber Kr.		IUAC/TR/AJM/2010-11/01
02.	Technical report on PMT electronics for NAND	S Venkatramanan, Arti Gupta, K S Golda, P Sugathan	Instrumentation	IUAC/TR/SV/2010-11/02
03.	Design of MS Platform for 1.7 MV Accelerator Lab in Engg. Building	MK Gupta	Civil	IUAC/TR/MKG/2010-11/03
04.	Oven Control System for PKDELIS	Y Mathur, RN Dutt, UK Rao. GO Rodrigues	Instrumentation	IUAC/TR/YM/2010-11/04
05.	Multi-channel Analyzer using Phoenix	VVV Satyanarayana, Parmanand Singh, Ajith Kr. B.P.	Instrumentation	IUAC/TR/VVVS/2010-11/05
06.	Development of Dual Fast Rate Divider	VVV Satyanarayanan, Ruby Shanthi	Instrumentation	IUAC/TR/VVVS/2010-11/06
07.	Mechanical Design. Fabrication & Assembly of Electrostatic Quadrupoles	R Ahuja, GO Rodrigues, D Kanjilal		IUAC/TR/RA/2010-11/07
08.	Assembly of Vanes in Prototype RFQ	R Ahuja, A Kothari. Sugam Kumar, CP Safvan		IUAC/TR/RA/2010-11/08
09.	Incorporation of Spin Spectrometer in HYRA Beam Line	Thomas V, N Madhavan, J Gehlot, S Nath, S Rao		IUAC/TR/TV/2010-11/09
10.	Scanning Magnet Power Supply controller	SK Suman, Rajesh Kumar, A Mandal	Instrumentation	IUAC/TR/SKS/2010-11/10
11.	Vacuum Insulated LN2 Piping for replacing part of existing Distribution network and extension of a new line	Suresh Babu MV, Anup Choudhary, Manoj Kr, Jacob Chacko, Soumen Kar, TS Datta	Development	IUAC/TR/SBMV/2010-11/11



	<b>Title</b>	<b>Authors</b>	<b>Category</b>	<b>Reference No.</b>
12.	A study of production rate enhancement of LN@ Plant by Return Cold Nitrogen gas from cryostats	Suresh Babu MV, Phaneendra Konduru, TS Datta	Maintenance	IUAC/TR/SBMV/2010-11/12
13.	Feasibility Report on Provision of Localised Window & Split Air-conditioners in Engineering Building First Floor	AJ Malyadri, Bishamber Kr.		IUAC/TR/AJM/2010-11/13
14.	Technical Report on 8 channel front end electronics	S Venkatramanan, P Sugathan	Instrumentation	IUAC/TR/SV/2010-11/14
15.	Technical Memo on High power solid state amplifier	S Venkatramanan, Parmanand Singh	Instrumentation	IUAC/TR/SV/2010-11/15
16.	Achromatic Bends of HEBT section of HCI	Sarvesh Kumar, A Mandal	Beam Transport Lab	IUAC/TR/SK/2010-11/16
17.	Magnetic Quadrupoles of HCI before RFQ	Sarvesh Kr., S.K.Saini, A Mandal	Beam Transport Lab	IUAC/TR/SK/2010-11/17

## **B. List of Technical Memos**

	<b>TITLE</b>	<b>AUTHORS</b>	<b>CATEGORY</b>	<b>REFERENCE NO.</b>
01.	Repairing of Gamma Area Monitors	Birender Singh, SP Lochab, Rajan Joshi	Health Physics	IUAC/TM/BS/2010-11/01
02.	Localised Air-conditioning in Radiation Biology Lab	AJ Malyadri, Bishamber Kr., Asiti Sarma		IUAC/TM/AJM/2010-11/02
03.	Servicing of Fast Com Tec Nuclear ADCs	VVV Satyanarayanan, Ruby Santhi	Instrumentation	IUAC/TM/VVVS/2010-11/03
04.	Troubleshooting of PKDELIS Cryo Cooler	Y Mathur, GO Rodrigues, UK Rao	Instrumentation	IUAC/TM/YM/2010-11/04
05.	Design and Development of telescopic beam pipe	Thomas V, N Madhavan, J Gehlot, S Nath, S Rao		IUAC/TM/TV/2010-11/05

## **6.10 TEACHING LAB ACTIVITIES**

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The usage of laboratory equipments developed under the Phoenix project is growing and new versions are being added. A compact Geiger-Muller counter with USB interface and a 256 channel MCA with USB interface are now available. A new Phoenix live CD based on the popular Ubuntu GNU/Linux distribution has been made. In this year we conducted three one-week training programmes for teachers at IUAC and a couple of “one day workshops” at various places were organized. Python programming language is now an integral part of the entire Phoenix training program and a book titled ‘Python in Education’ is now available and can be freely downloaded from the Phoenix website. Phoenix based experiments have been recognized by some universities and are included in their curriculum/syllabus both at undergraduate and graduate levels.