6. ACADEMIC ACTIVITIES

6.1 PELLETRON BEAM UTILIZATION BY USERS

6.1.1 Pelletron Beam Time Utilization and Experiments performed (April 2004-March 2005)

USERS	No. of shifts allotted	PROJECTS IN			
		Nuclear Physics	Materials Science	Radiation Biology	Atomic Physics
A. Universities/Colleges					
Agra University	10		2		
AM University, Aligarh	14	1	2		
Andhra University	2		1		
Anna University, Chennai	8		2		
Bangalore University	3		1		
BH University, Varanasi	18	1			
Calcutta University	5		2		
Cochin University	5		2		
DAV, Indore	3		1		
Delhi University	9	1	1		
GND University, Amritsar	3		1		
Guru Ghasidas University	2		1		
Gulbarga University	2		1		
JMI University, New Delhi	2		1		
Karnataka University	12	1			
Kiel University, Germany	3		1		
Kurukshetra University	3		1		
Mangalore University	2		1		
MG University, Kottayam	4		2		
MS University, Baroda	2		1		

USERS	No. of shifts allotted	PROJECTS IN			
		Nuclear Physics	Materials Science	Radiation Biology	Atomic Physics
Mumbai University	43	1	4		
NEH University, Shillong	1			1	
NM University, Nandurbar	2		1		
Presidency College, Kolkata	4			1	
Pune University	11		3		
Punjab University	45	3	2		
Rajasthan University	10		3		
Saurashtra University	6		2		
B. Institutions					
CSNSM, France	3		1		
DRDO, Jodhpur	3		1		
IIT, Delhi	2		1		
IIT, Mumbai	29	1	1		
IOP, Bhubaneswar	13		3		
ISRO, Bangalore	1		1		
IUC-DAE, Indore	6		2		
KIIT, Bhubaneswar	4		1		
Max Plank Institute, Germany	4		1		
NIT, Kurukshetra	4		2		
NSC, New Delhi	27		6		
SINP, Kolkata	33	3			
SPS, JNU	2		1		
VECC, Kolkata	3		1		
C. Facility tests	60				
Total	**428**	**12**	**61**	**2**	**–**

6.1.2 List of Users Family

The following list includes universities/colleges/institutions that have used the NSC Pelletron facility (once or more) since 1991.

(A) UNIVERSITIES - (68)

01.	Agra University	Agra
02.	Aligarh Muslim University	Aligarh
03.	Allahabad University	Allahabad
04.	Andhra University	Waltair
05.	Anna University	Chennai
06.	Assam University	Silchar
07.	Banaras Hindu University	Varanasi
08.	Bangalore University	Bangalore
09.	Berhampur University	Berhampur
10.	Bhagalpur University	Bhagalpur
11.	Bombay University	Mumbai
12.	Burdwan University	Burdwan
13.	Calcutta University	Kolkata
14.	Calicut University	Calicut
15.	Chaudhury Charan Singh University	Meerut
16.	Cochin University	Cochin
17.	Cochin University of Science & Technology	Cochin
18.	Delhi University	Delhi
19.	Devi Ahilya University	Indore
20.	G.B. Pant University	Pantnagar
21.	Gauhati University	Guwahati
22.	Gulbarga University	Gulbarga
23.	Guru Ghasidas University	Bilaspur
24.	Guru Nanak Dev University	Amritsar
25.	Himachal Pradesh University	Simla
26.	HNB Garhwal University	Srinagar Garhwal
27.	Hyderabad University	Hyderabad
28.	Jamia Milia Islamia University	New Delhi

29.	Jammu University	Jammu
30.	Jawaharlal Nehru University	New Delhi
31.	Kalyani University	Kalyani
32.	Karnataka University	Dharwad
33.	Kiel University	Germany
34.	Kurukshetra University	Kurukshetra
35.	Lucknow University	Lucknow
36.	Ludwig Maximillian University	Munich, Germany
37.	M.D. University	Rohtak
38.	M.L. Sukhadia University	Udaipur
39.	M.S. University	Baroda
40.	Madras University	Chennai
41.	Mahatama Gandhi University	Kottayam
42.	Mangalore University	Mangalore
43.	Manipur University	Imphal
44.	Mannonmaniam Sundarnar University	Tirunelveli
45.	Mysore University	Mysore
46.	Nagpur University	Nagpur
47.	North Eastern Hill University	Shillong
48.	North Maharashtra University	Nandurban
49.	Osmania University	Hyderabad
50.	Patna University	Patna
51.	Pondichery University	Pondichery
52.	Poona University	Pune
53.	Punjab Agricultural University	Ludhiana
54.	Punjab University	Chandigarh
55.	Punjabi University	Patiala
56.	Rani Durgawati University	Jabalpur
57.	S.K. University	Anantpur
58.	Stuttgart University	Germany
59.	Saurashtra University	Rajkot
60.	Technical University	Darmstadt, Germany
61.	Tezpur University	Tezpur

62.	Shivaji University	Kolhapur
63.	University of Maryland	Maryland, USA
64.	University of Notre Dame	Notre Dame, USA
65.	University of Rajasthan	Jaipur
66.	Utkal University	Bhubaneswar
67.	Vikram University	Ujjain
68	Vishwa Bharti University	Bolpur

(B) COLLEGES – (43)

01.	Anand Mohan College	Kolkata
02.	Armed Forces Medical College	Pune
03.	Belonia College	Belonia, Tripura
04.	Bharatiya Jain Sanghatana College	Pune
05.	Bhiwandi College	Mumbai
06.	BNN College	Bhivandi, Madhya Pradesh
07.	CHM College	Ulhasnagar, Maharashtra
08.	College of Engineering and Technology	Aligarh
09.	DAV College	Mumbai
10.	DBS College	Dehradun
11	Doodhsakhar Mahavidyalaya	Bidri, Maharashtra
12	Govt. Art College	Rajamundri, Andhra Pradesh
13	Govt. College	Ajmer
14.	Govt. College	Mehendragarh
15.	Govt. College	Kota
16.	Goyalpara College	Goyalpara, Assam
17.	Gurudas College	Kolkata
18.	Jai Hind College	Mumbai
19.	Kongunadu Arts & Science College	Coimbatore
20.	Koshi College	Khagaria, Bihar
21.	Mahila Degree College	Lucknow
22.	MR College	Vizianagram (AP)
23.	Malviya Regional Engg. College	Jaipur
24.	Nayagarh College	Nayagarh

25.	Nizam College	Hyderabad
26.	NSAM College	Mangalore
27.	Orissa Univ. of Agriculture & Tech.	Bhubneshwar
28.	Poorna Prajna College	Udipi, Karnataka
29.	Punjab Engineering College	Chandigarh
30.	RBS College	Agra
31.	RD & DJ College	Munger, Bihar
32.	Regional Engineering College	Kurukshetra
33.	RPG College	Ratnagiri
34.	School of Physical Sciences	Nanded, Maharashtra
35.	School of Tech. & Applied Sciences	Kottayam, Kerala
36.	SDM College	Ujire, Mysore
37.	Sharanabasaveshwar College of Science	Gulbarga
38.	Sri Bhuvanendra College	Karkala
39.	St. Edmunds College	Shillong
40.	Swami Shardhanand College	New Delhi
41.	University College	Kurukshetra
42.	University College of Science & Tech.	Kolkata
43.	Vaish College	Rohtak

(C) OTHER INSTITUTIONS - (45)

01.	AICTE	New Delhi
02.	Amity School of Engineering	New Delhi
03.	Bhabha Atomic Research Centre	Mumbai
04.	C.E.E.R.I.	Pilani
05.	CAT	Indore
06.	Centre for Superconductivity research	USA
07.	CSNSM, Orsay Cedex	France
08.	D.M.R.L.	Hyderabad
09.	Dayalbagh Educational Institute	Agra
10.	Defence Laboratory	Jodhpur
11.	Defence Research & Development Orgn.	Dehradun
12.	Ginetic Institute of Manufacturing Technology	Singapore

13.	Harcourt Butler Technological Institute	Kanpur
14.	I.G.C.A.R.	Kalpakkam
15.	Indian Institute of Science	Bangalore
16.	Indian Institute of Technology	Chennai
17.	Indian Institute of Technology	Kanpur
18.	Indian Institute of Technology	Kharagpur
19.	Indian Institute of Technology	Mumbai
20.	Indian Institute of Technology	New Delhi
21.	Indian Institute of Technology	Roorkee
22.	Indian Space Research Organisation	Bangalore
23.	INFN-LEGNARO	Italy
24.	INMAS	New Delhi
25.	Institute of Basic Sciences	Agra
26.	Institute of Materials Science	Bhubaneswar
27.	Institute of Physics	Bhubaneswar
28.	Institute of Science	Mumbai
29.	IUC-DAEF, Calcutta Centre	Kolkata
30.	IUC-DAEF, Indore Centre	Indore
31.	Joint Inst. of Nuclear Research	Dubna, Russia
32.	KIIT	Bhubaneswar
33.	Massachusetts Inst. of Technology	USA
34.	Nanocrystals Technology	USA
35.	National Academy of Science	Allahabad
36.	National Institute of Technology	Kurukshetra
37.	National Physical Laboratory	New Delhi
38.	Oak Ridge National Laboratory	USA
39.	Saha Institute of Nuclear Physics	Kolkata
40	Sant Longowal Institute of Technology	Sangrur
41.	SSPL	New Delhi
42.	Tata Institute of Fundamental Research	Mumbai
43.	Thapar Inst. Of Eng. & Technology	Patiala
44.	VECC	Kolkata
45.	Wadia Institute of Himalayan Geology	Dehradun

6.2 M.Sc. Orientation programme

N. Madhavan

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.

The details of the projects carried out in various fields in the year 2004-2005 are given below.

Name of student	**Affiliation**	**Project title**	**Guide/Lab. at NSC**
Mr. Avneesh Anshul	Barkatullah University, Bhopal	Fourier Transform Infra-Red characterization of materials	Mr. Fouran Singh, Materials Sciences Lab.
Mr. Ananta Charan Pradhan	Utkal University, Bhubaneswar	Thin film deposition of ZnO by RF sputtering	Mr.V.V. Shivakumar, Materials Sciences Lab.
Ms. Haorokcham Sanatombi	DAVV, Indore	Measurement of gamma attenuation coefficient of different materials	Mr. Subir Nath, HIRA Lab.
Ms. Khuraijam Namrata	DAVV, Indore	Study of charge state distribution of Electron Cyclotron Resonance plasma	Mr. Pravin Kumar, LEIBF Lab.
Ms. Sharmishtha Bhattacharjee	Delhi University, Delhi	Study of radiation detectors	Mr. Akhil Jhingan, Detector Lab.
Mr. Vasim F. Khan	Mumbai University, Mumbai	Detectors	Mr. Akhil Jhingan, Detector Lab.
Mr. Vaibhav C. Hatode	Mumbai University, Mumbai	ECIRS	Mr. G.O. Rodrigues, ECR Lab.

Name of student	Affiliation	Project title	Guide/Lab. at NSC
Ms. Rachi Kemkar	M.S. Univ., Baroda	Radio-frequency impedance measurements using tunnel diode oscillator technique	Mr. R. N. Dutt, Materials Sciences Lab.
Mr. Rakesh D. Chauhan	M.S. Univ., Baroda	Study of hydrogen release from Si-based polymer under heavy ion irradiation by ERDA	Mr. Saif Ahmad Khan, Materials Sciences Lab.
Mr. Suman Acharyya	Visva Bharati Univ., Shantiniketan	Stability test of double width high density NIM modules with clover detector	Mr. Rakesh Kumar, GDA Lab.
Mr. Bhaswar Chatterjee	Visva Bharati Univ., Shantiniketan	Testing of organic scintillator neutron detectors using ^{60}Co and ^{252}Cf sources	Ms. K.S. Golda, Neutron Lab.
Mr. Kashish Sharma	GNDU, Amritsar	Resistivity measurement techniques	Dr. Ravi Kumar, Materials Sciences Lab.
Ms. Anu Jagia	GNDU, Amritsar	Study of variation of band energy gap with irradiation using absorption spectra	Mr. Fouran Singh, Materials Sciences Lab.

6.3 LIBRARY

Priyambada Nayak and R.N. Dhyani

Salient features

Working hours : Round the clock, all days of the week

Total Books : ~2425 (broadly covering the subjects Nuclear Physics, Materials Science, Electronics, Computers, Vacuum Instrumentation, Radio-biology, Radiation Physics, Cryogenics, Atomic Physics, Mathematical Physics, Quantum Mechanics, Astrophysics etc.)

New Books added in 2004-05	:	80
Current Journals	:	44
New Journals added in 2004-05	:	01
Bound Journals	:	~7000
Laboratory Reports	:	~900 (from nearly 50 labs)
New Reports arrived in 2004-05	:	30
Reprints/Photocopies	:	~700
Newsletters, House magazines etc.	:	50
Databooks, Manuals etc.	:	~550
Ph.D. Thesis	:	80
CD-ROM Database	:	INIS 1976-present
Microfilm Collection	:	IEEE Transactions on Nuclear Science Vol. 1-32 (1954-85)
Hardware	:	Cyrix M II with 64MB RAM & 2.1GB HD. Minolta RP 503 Microfilm reader-printer
Collaborating Arrangements	:	Photocopy Service from INSDOC
Clientele	:	Apart from NSC 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 NSC are also compiled and kept in the library for reference purpose. ERL server from Silver Platter has been installed on intranet server to access the INIS database. Web-based OPAC and library cataloging software package has been installed for the computerization of library documents. The catalog of books, Ph.D. Thesis, Manuals, Conference Proceedings are already computerized and it can be searched by author, title, keyword etc. With the advent of the facility for online access of various journals through internet, full-text of a number of journals is now accessible. Apart from the print journals, PROLA and IOP journal archive (online) are also being subscribed by the library. The library is open round the clock. Hence, automatic monitoring system has been installed.

6.3.1 Digital Repository using "Dspace"

Sugathan. P

Our library has implemented a digital repository using the open source **Dspace** technology. A test and evaluation server has been setup on a LAN machine for this purpose. This institutional repository will be used to capture, store, index and distribute the research output materials in digital format. After considering many open source packages available for setting up digital repository, we have decided to use Dspace downloaded from MIT. Dspace supports all known digital formats like pdf, doc, ppt, html, gif, ps, avi, wav, rtf, txt, etc. All contents like Technical Reports, pre-prints, thesis, lecture notes, proposals, presentations, drawings, source codes etc can be captured and archived using Dspace. An open access server will be soon be setup after the evaluation is over.

6.4 THE PHD TEACHING PROGRAMME

S.K. Datta

The two-semester Ph.D. Modular courses offered to university students and young faculty is running well. In the Jan- May Semester, Experimental Physics and Accelerator Physics were offered and in the August-December Semester, Computers in Instrumentation and Data acquisition, Materials Science Courses and Nuclear Physics courses were offered. From this year it was decided to offer both Nuclear Physics and Materials Science together instead of in alternate years as was the practice in the past.

The duration of the courses were increased this year keeping in mind the demand of student groups who felt that the material was too condensed. The decision was taken in the academic committee and the syllabus for the courses was also altered to keep pace with recent changes. Generally each course is divided in 5 sub modules, except Experimental Physics which is divided into 6 modules. The number of credit hours has been increased to 4 from the original 3. As a result, the number of lectures being given in each sub module has also been increased to 8 - one and a half hour lectures and two tutorials/ discussion sessions. Emphasis is put on home works and assignments. The courses are being taught by selected staff members of NSC as well as reputed teachers from outside.

At the beginning of each semester, a poster is printed and circulated to various universities, Departments of Physics, inviting application for attendance to the courses. Accommodation and TA/DA are provided to the selected participants. Information is also available on our website.

In Jan-May, 2004 Semester, 23 students from 12 universities participated. They were from Aligarh Muslim University, Anna University, APS University, Rewa, Chaudhuri

Charan Singh University, Meerut, GB Pant University, Hyderabad University, Jawaharlal Nehru University, Karnatak University, Kerala University, MS University, Baroda, Sai Satya Inst. of Higher Learning and Saurashtra University. In addition 2 scientist trainees, 3 JRF's and 2 project assistants of NSC also participated in the course work.

In Aug-Dec Semester in 2004, 17 students from 12 universities and 1 college attended. The representations were from Allahabad University, Banaras Hindu University, B.R.Ambedkar University, Calicut University, Chaudhuri Charan Singh University, Cochin University, Guru Ghasidas University, Guwahati University, Jiwaji University, Karnatak university, MS University, Baroda, Mumbai University and PSG College, Coimbatore. 5 scientist trainees, 5 JRFs and 2 project assistants also attended.

6.5 ACADEMIC ACTIVITIES HELD IN 2004-2005

22nd - 23rd April, 04	Workshop on "Accelerator & Environmental Radiation Safety" at NSC
21st May	NSC Acquaintance Programme at Jammu
7th-8th June	Workshop on "LEIBF" at NSC
6th - 7th July	USER WORKHSOP - Accelerator Users Presentations for Beam Time Proposals
8th July	AUC meeting
22nd-23rd July	Nuclear Physics Workshop/Acquaintance Program at Sri Satya Sai Institute of Higher Learning (SSSIHL), Prasantinilayam(A.P.)
29th July	Ph.D. Teaching Program, Fall Semester starts
11th-13th August	Academic Workshop for NSC staff
17th September	Workshop on "Nuclear Physics with LINAC Beams" at NSC
4th - 9th October	Joint School with Institute of Physics, Bhubaneswar at IOP
14th October	NSC Acquaintance Programme at Calicut
17th - 18th December	USER WORKSHOP - Accelerator Users Presentations for Beam Time Proposals
19th December	Foundation Day & AUC meeting
18th January, 2005	Ph.D. Teaching Program ; Spring Semester starts

31st Jan - 2nd Feb.	Teaching workshop at NSC
16th-17th February	NSC Academic Workshop
18th-19th February	International Workshop on "Nano-Structuring by Ion Beams" at NSC
20th -24th February	Indo-German International Workshop on "Synthesis and Modification of Nano-Structured Materials by Energetic Ion Beams" at ICGEB, New Delhi
21st -24th March	International workshop on "Nuclear Structure Physics at the Extremes: New Directions (NUSPE05)" at HP University, Shimla

6.6 CALENDAR OF EVENTS: 2005

20th May	NSC Acquaintance Program at NEHU, Shillong Contact Person: R.K. Bhowmik, NSC
6-7th July	User Workshop - Accelerator Users Presentations for Beam Time Proposals
8th July	AUC Meeting
28th July	NSC Ph.D Teaching Program: Fall Semester starts
10-12th August	NSC Academic Workshop
26th August	NSC Acquaintance Program at Jiwaji University, Gwalior (Contact Person: D.K. Avasthi, NSC)
16th September	Workshop on RFQ at NSC (Contact Person: C.P. Safvan, NSC)
21st October	Workshop on Radiation Biology at NSC (Contact Person: Asiti Sarma, NSC)
18th November	NSC Acquaintance Program at Sardar Patel University, Gujarat (Contact Person: A. Tripathi, NSC)
17-18th December	User Workshop - Accelerator Users Presentations for Beam Time Proposals
19th December	Foundation Day and AUC Meeting

6.7 LIST OF SEMINARS CONDUCTED IN THE YEAR 2004-2005

Sr. No.	*Date*	*Title*	*Name & Affiliation*
1	26.4.04	Columb and Nuclear Breakup of Halo Nuclei	Prof. T. Nakamura Tokyo Inst. of Technology
2	13.5.04	Cryogenic Instrumentation at CERN	Mr. Joby Antony NSC
3	04.6.04	Synthesis & Characterization of Nanophase Materials	Dr. Ramesh Chandra CCS, Meerut
4	04.6.04	Columb and Nuclear Breakup of ^{11}Li	Dr. A.M. Vinod Kumar Tokyo Inst. of Technology
5	17.6.04	Probing the Nature with Accelerator	Dr. Susanta Lahiri SINP, Kolkata
6	14.6.04 & 15.6.04	Some problems of current interests in the physics of atomic collisions and spectroscopy	Dr. P.C Deshmukh IIT, Madras
7	19.7.04	A novel technique for beta-delayed proton decay spectro-scopy of proton-rich nuclei	Dr. Vaishali Banerjee VECC, Kolkata
8	22.7.04	Study of some superconducting structures using STM/S	Dr. Anjan K. Gupta IIT, Kanpur
9	28.7.04	Chirality in atomic nuclei	Dr. Pankaj Joshi York Univ, UK
10	15.9.04	Spectroscopic Factors from Coulomb Break up of Light Nuclei	Dr. R. Palit TIFR, Mumbai
11	21.9.04	Rising and the GSI future	Prof. Hans Juergen W. GSI, Darmstadt, Germany
12	9.10.4	Measurement of PP Scattering analysing power at low energy	Dr. Dhruba Gupta VECC, Kolkatta
13	12.10.04	Anisotropic Properties of MgB2	Prof. Oscar F. De Lima Instituo de Fisica Gleb Wata, Unicamp, Brazil

Sr. No.	*Date*	*Title*	*Name & Affiliation*
14	2.11.04	RF and microwave Products and Solutions	Mr. Kuldeep Tikoo M/A Com, Country Manager, India
15	8.11.04	Determination of half life of trans-actinium isotopes & Microvolts Generated by Gas Flow over Materials	Dr. S.K Aggarwal Head, Mass Spectrometry section, BARC Mr. V.V Siva Kumar NSC, New Delhi
16	9.11.04	Proposed CNC Vertical machining centre	Mr. Jimson Zacharias NSC
17	24.11.04	Nobel prize in Physics, 2004	Prof. A. Mishra IIT, Delhi
18	1.12.04	Online Indenting	Mr. E.T Subramaniam NSC
19	9.12.04	Actual status of the EDR beamline at bessy synchrotron in Berlin	Prof. W. Leitenberger Potsdam Univ., Germany
20	13.12.04	Tensions between the cosmic & intimate	Prof. Yashpal, Former Chairman, UGC
21	23.12.04	X-ray spectroscopy on cooled heavy ions at storage rings	Dr. Stoehlker Thomas GSI, Germany
22	6.1.05	Internet the world wide web	Dr. Ranjan Bhowmik NSC
23	13.1.05	How to innovate?	Prof. G.K. Mehta NSC
24	17.1.05	Momentum spectroscopic studies of molecular fragmentation	Dr. Bhas Bapat PRL, Ahmedabad
25	19.1.05	Precision measurement for atomic & nuclear physics using ion traps	Prof. J. Kluge, GSI, Daramstadt
26	20.1.05	How does Laser work?	Dr. D.Kanjilal NSC

Sr. No.	*Date*	*Title*	*Name & Affiliation*
27	27.1.05	How does computer control?	Mr. B.P Ajithkumar NSC
28	27.1.05	Laser spectroscopy weakly bound molecular cluster	Dr. Tapas Chakraborty IIT, Kanpur
29	28.1.05	Application of HTS wires and tapes for power equipment	Dr. Swarn Kalsi & Dr. Larry Masur, American supercond corp., Westborough
30	7.2.05	Switchable Mirrors	Prof. L.K Malhotra IIT, Delhi
31	14.2.05	Protein structure and structural based rational drug design	Dr. T.P. Singh, AIIMS
32	17.2.05	How does DVD work?	Mr. B.K Sahu NSC
33	7.3.05	A signal from a close supernova three million years ago	Dr. Gunther Korschinek Germany
34	7.3.05	Revisiting Newton's laws	Prof. Amitabha Ghosh IIT, Kanpur
35	10.3.05	Global Positioning	Dr. C.P. Safvan NSC
36	24.3.05	Amateur Radio	Mr. S. Venkataramanan NSC
37	28.3.05	Physics of intense microwave plasma ion sources: from high frequency to high power sources	Dr. Sudip Bhattacharjee IIT, Kanpur
38	28.3.05	Nanostructure and morphology of polyvinylidene fluoride/layered silicate nanocomposites	Dr. Pralay Maiti BHU, Varanasi

6.8 LIST OF PUBLICATIONS (2004-2005)

A. NUCLEAR PHYSICS

1. Band structures of the ^{123}Cs nucleus, K. Singh, J. Goswamy, D. Mehta, N. Singh, R.P. Singh, S. Muralithar, E.S. Paul, K.P. Singh, N. Madhavan, J.J. Das, S. Nath, A. Jhingan, P. Sugathan, R.K. Bhowmik, Eur. Phys. J. A 21, 359 (2004)

2. High-spin states in the odd-odd nucleus ^{146}Tb, Krishichayan, A. Chakraborty, S.S. Ghugre, R. Goswami, S. Mukhopadhyay, N.S. Pattabiraman, S. Ray, A.K. Sinha, S. Sarkar, P.V.M. Rao, U. Garg, S.K. Basu, B.K. Yogi, L. Chaturvedi, A. Dhal, R.K. Sinha, M.S. Sarkar, S. Saha, R. Singh, R.K. Bhowmik, A. Jhingan, N. Madhavan, S. Muralithar, S. Nath, R.P. Singh, P. Sugathan, Phys. Rev. C 70, 044315 (2004)

3. Lifetime measurements of microsecond isomers in the N = 48 nuclei ^{88}Zr and ^{90}Mo using recoil-isomer tagging, A. Chakraborty, Krishichayan, S.S. Ghugre, R. Goswami, S. Mukhopadhyay, N.S. Pattabiraman, S. Ray, A.K. Sinha, S. Sarkar, P.V.M. Rao, U. Garg, S.K. Basu, L. Chaturvedi, A. Dhal, R.K. Sinha, I.M. Govil, M.B. Chatterjee, M.S. Sarkar, R.K. Bhowmik, A. Jhingan, N. Madhavan, S. Muralithar, S. Nath, R.P. Singh, P. Sugathan, Phys. Rev. C 70, 014311 (2004)

4. In search of collectivity in $^{95, 97}$Mo nuclei, J.M.Chatterjee, M. Saha-Sarkar, S. Bhattacharya, S. Sarkar, R.P. Singh, S. Murulithar, R.K. Bhowmik, Phys. Rev. C 69, 044303 (2004)

5. High spin states of ^{141}Pm, S. Bhattacharyya, S. Chanda, T. Bhattacharjee, S.K. Basu, R.K. Bhowmik, S. Muralithar, R.P. Singh, S.S. Ghugre, Nucl. Phys. A730, 23 (2004)

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B. MATERIALS SCIENCE

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C. OTHERS

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6.9 LIST OF TECHNICAL REPORTS/TECHNICAL MEMOS (2004-05)

A. LIST OF TECHNICAL REPORTS

Sr. No.	*Title*	*Authors*	*Category*	*Reference No.*
1.	Defects observed on Asphalt or Bitumen roads	M.K. Gupta	Civil	NSC/TR/MKG/ 2004-05/01
2.	Provision of RCC bands and vertical reinforcement in load bearing walls for earthquake protection	M.K. Gupta	Civil	NSC/TR/MKG/ 2004-05/02
3.	FPGA based CAMAC histogram module	R. Ruby Shanti, BPAjithkumar, Kundan Singh, R.Kumar	Instrumentation	NSC/TR/RRS/ 2004-05/03
4.	24 Bit Input Gate	Mamta Jain	Instrumentation	NSC/TR/MJ/ 2004-05/04
5.	Gonio-XRR Control Module	Mamta Jain	Instrumentation	NSC/TR/MJ/ 2004-05/05
6.	24 Bit output register module	Mamta Jain	Instrumentation	NSC/TR/MJ/ 2004-05/06
7.	VCB panel for Nuclear Science Centre	U.G. Naik, R.Kumar	Instrumentation	NSC/TR/UGN/ 2004-05/07
8.	Q-mail linux based mail server	S.Bhatanagar, S. Mookerjee	Computers	NSC/TR/SB/ 2004-05/08
9.	Local and remote control of high voltage power supply	Suraj Kumar, Rajesh Kumar, S.K. Suman	Accelerator Mass Spectroscopy (AMS)	NSC/TR/SK/ 2004-05/09
10.	Preparation & study of mixed sulphate phosphor Ca(1-x) Bax (SO4)2: Eu as a TLD phosphor for radiation dosimetry using thermoluminescence	S.P. Lochab, Numan Salah, P.D. Sahare, R.S. Chauhan	Health Physics	NSC/TR/SPL/ 2004-05/10

Sr. No.	*Title*	*Authors*	*Category*	*Reference No.*
11.	Development and preservation of Praseodymium target development laboratory	Abhilash S.R., Vivek Kumar, D. Kabiraj	Thin Film Development	NSC/TR/ASR/ 2004-05/11
12.	Radioactivity measurement of ^{60}Co using Sum-Peak Technique	Dinesh Negi, K.S. Golda, P. Sugathan, R.K. Bhowmik	Development	NSC/TR/ASR/ 2004-05/12
13.	Radon a tracer for helium exploration in the geothermal springs	R.G.Sonkawade, D. Ghosh, T.S. Datta, A. Kothari, D. Kanjilal, V.M. Choubey, Yogesh Prasad, Ganesh Prasad & R.C. Ramola	Radiation Physics	NSC/TR/RGS/ 2004-05/13
14.	Development of 400kV, 75kVA, 3 phase DC Isolation Transformer	Raj Kumar	Electrical	NSC/TR/RK/ 2004-05/14
15.	Fabrication of the first niobium superconducting resonator at NSC	P.N. Prakash, J. Zacharias, K.K. Mistry	Accelerator	NSC/TR/PNP/ 2004-05/15
16.	Upgradation of LAN with managed switches	S.Bhatnagar & S. Mookerjee	Computers	NSC/TR/SB/ 2004-05/16
17.	BeO sample preparation from Be-Standard solution	Pankaj Kumar, J.K. Pattanaik, S.Majhi, K.Roy, S.Gargari, S. Chopra, S.K. Datta, K. Devarani, S. Lahiri	Development	NSC/TR/PK/ 2004-05/17
18.	15° beam line at the Low Energy Ion Beam	G.K.Padmashree, G.Rodrigues,	Accelerator Instrumentation	NSC/TR/GKP/ 2004-05/18

Sr. No.	*Title*	*Authors*	*Category*	*Reference No.*
	Facility (LEIBF)	R. Ahuja, U.K. Rao, C.P.Safvan, P. Kumar, J. Zacharias, S.K. Suman, S. Rao & D. Kanjilal		
19.	Linux based web & proxy server at the centre	S.Bhatanagar & S. Mookerjee	Computers	NSC/TR/SB/ 2004-05/19
20.	Eight Channel Slow Tuner Control Electronics module	Ashutosh Pandey, B.P. Ajithkumar, B.K. Sahu	Instrumentation	NSC/TR/AP/ 2004-05/20
21.	Immunity to voltage sag or small interruptions for helium, compressor motors	Raj Kumar	Electrical	NSC/TR/RK/ 2004-05/21
22.	Electron beam welding parameter development for fabricating niobium cavities	K.K. Mistry, P.N. Prakash, Jimson Zacharias	Accelerator	NSC/TR/KKM/ 2004-05/22
23.	Set-up and experiments on RF effects of LINAC thermometry using CRYO-DACS	Joby Antony, D.S. Mithuria, T.S. Datta	Instrumentation	NSC/TR/JA/ 2004-05/23
24.	Water Leakage Detector	Yaduvansh Mathur	Instrumentation	NSC/TR/YM/ 2004-05/24
25.	Analysis of the soil samples for the assessment of the average effective dose	R.G.Sonkawade, B.R. Kerur, D. Kanjilal, R.C. Ramola	Radiation Physics	NSC/TR/RGS/ 2004-05/25
26.	Remote control facility for helium cold and warm expanders	Raj Kumar	Cryogenic	NSC/TR/RK/ 2004-05/26

B. LIST OF TECHNICAL MEMOS:

Sr. No.	*Title*	*Authors*	*Category*	*Reference No.*
1.	Breakdown of 19XL chiller of Phase-2 AC Plant	A.J. Malyadri	–	NSC/TM/AJM/ 2004-05/01
2.	Repairing of 19XL chiller pf Phase-2 AC Plant	A.J. Malyadri	–	NSC/TM/AJM/ 2004-05/02
3.	Breakdown of blower in AHU#2 of Phase-2 AC plant	A.J. Malyadri	–	NSC/TM/AJM/ 2004-05/03
4.	Installation of Reverse Osmosis (RO) Plant	A.J. Malyadri	–	NSC/TM/AJM/ 2004-05/04
5.	Over Hauling of 11 kV, 5000kVA transformers at NSC	U.G. Naik, Raj Kumar	Instrumentation	NSC/TM/UGN/ 2004-05/05
6.	Modification of HT panel for NSC	U.G. Naik, Raj Kumar	Instrumentation	NSC/TM/UGN/ 2004-05/06
7.	Servicing of 1000 kVA Servo voltage stabiliser at NSC	U.G. Naik and Raj Kumar	Instrumentation	NSC/TM/UGN/ 2004-05/7
8.	Thread failure of threaded mounting holes in coupling central flange	B.Kumar, A.J. Malyadri, Piyush Gupta	–	NSC/TM/BK/ 2004-05/8
9.	Radiation Survey of PKDELIS ECR Ion Source	S.P. Lochab	Health Physics	NSC/TM/SPL/ 2004-05/9
10.	Controlling a heater in auto closed loop mode for level monitoring and control using VME CRYO-DACS	Joby Antony, Anup Choudhary and T.S. Datta	–	NSC/TM/JA/ 2004-05/10

Sr. No.	*Title*	*Authors*	*Category*	*Reference No.*
11.	A Test bench set-up to study the measurement errors due to RF in diode thermometry of super-conducting resonators	Joby Antony, Anup Choudhary, D.S. Mithuria and T.S. Datta	–	NSC/TM/JA/ 2004-05/11
12.	Beam Sweep Amplifier	Yaduvansh Mathur and U.K. Rao	Instrumentation	NSC/TM/YM/ 2004-05/12
13.	Repairing of steerer power supply	Yaduvansh Mathur and U.K. Rao	Instrumentation	NSC/TM/YM/ 2004-5/13
14.	Repairing of BPM amplifier	Yaduvansh Mathur and U.K. Rao	Instrumentation	NSC/TM/YM/ 2004-05/14
15.	Repairing of Neutron Area and Monitors	Birendra Singh, R. Joshi and S.P. Lochab	Instrumentation	NSC/TM/BS/ 2004-05/15

6.10 Development of equipment for University Laboratories

B.P. Ajithkumar, A. Mandal, P. Sugathan, K. Asokan and S.K. Datta

The Nuclear Science Centre has started a program for development of innovative experiments for teaching laboratories in the universities. After an inaugural workshop in 2003, which was attended by the then Hon. Minister of HRD, Shri Murli Manohar Joshi and many distinguished speakers from all over the country, two more workshops have been held in 2004 and early 2005. These were attended by many members from various universities. Listed below are some of the experiments and equipments developed at NSC for this purpose. Many of these equipments have been distributed to various groups after providing them suitable training in handling these equipments.

6.10.1 CsI detector for Gamma Ray

P. Sugathan and A. Jhingan

A CsI detector of smaller size (10x10x5mm^3) has been tested for gamma ray detection. The crystal is coupled to a 10 mm X 10 mm PIN-photo diode for signal read

out. Since photo multiplier tube is not used, the cost of the spectrometer is much reduced. These detectors can be used as cost effective gamma ray detector for university teaching labs. A typical gamma ray spectrum using ^{137}Cs source is shown in the figure here. The spectrum was obtained with D-C coupled charge sensitive pre-amplifier (home made) and operated at 50 volt bias.

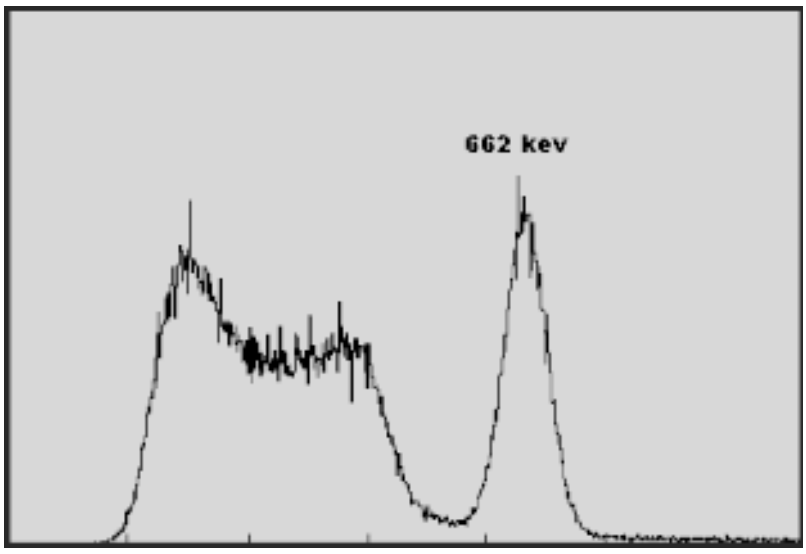

Fig. 1 : Gamma ray spectrum from ^{137}Cs source measured using a 10 x 10 x 5 mm^3 CsI detector coupled with photo diode readout.

6.10.2 Radiation Detection & Analysis System for University laboratories

B.P. Ajithkumar, V.V.V. Satyanarayana, S. Venkataramanan and A. Jhingan

The high cost and poor after sales support of the commercially available detector, pre-amplifier, shaping amplifier, multi channel analyzer is a major hurdle for any university lab dealing with it. We have developed a low cost system with all these components in a 19" box with a PC parallel port interface. The system allows using the individual sections separately. A one sq. cm. p-n diode solar cell is used for detecting alphas and fission fragments. Energy spectrum is measured and studies like energy loss of charged particles in different materials can be studied using this unit. Twelve such units have been distributed to different universities in 2004 and seven more in 2005.

6.10.3 Physics with Homemade Equipments and Innovative Experiments, PHOENIX

B.P. Ajithkumar and V.V.V. Satyanarayana

This is a simple interface box that can be connected to the PC parallel port

providing features like Analog and Digital Input/Output, Function generators, Motor Control, Amplifiers etc. Along with the microsecond accuracy timer of the PC a host of physics lab experiments can be done using this. Experiments to measure acceleration due to gravity by time of flight, simple pendulum, direct measurement of velocity of sound, transient electrical phenomena etc. has been demonstrated so far using this equipment. The circuit uses only locally available components and the cost has been kept very low. Several universities have shown interest in acquiring this interface and we are taking necessary steps to make it available to all the college laboratories. Commercial production has been started.

6.10.4 Development of Spark Counter

A. Mandal, S.K. Saini, Rajesh Kumar, S.K. Suman and S.K. Datta

A spark counter has been developed as a simple detection system for alpha particle. The device consists of a single wire stretched in front of a flat metal plate. Unlike a GM detector, the system works in air. An Aluminum block on a flat base is used as cathode plate. A 50 micron diameter gold plated tungsten wire is stretched over the studs and held tight at both the ends. The plate and the studs are accurately machined to keep uniform separation (~1 mm) between wire and plate. A positive voltage of 2.5 kV is applied to the wire. A strong electric field exists between the wire anode and plate cathode in atmospheric air. On the passage of ionizing particle between the wire and plate, an electron avalanche in the vicinity of the wire is generated, resulting in a spark breakdown between them. The system exhibits counting characteristics with a reasonably flat plateau. Then it can be operated at a chosen voltage lying midway in the plateau region. The number-distance curve for an alpha source (^{243}Am) for such a spark counter operated at a fixed voltage is determined. The range of alpha particle in air can be determined by this method. High voltage supply and spark counter is locally developed at a price of about Rs. 10,000.

Product Description:

i. **Spark chamber:** It is a chamber made of insulated material (perspex sheet) housing two electrodes- an aluminum plate and a thin gold plated tungsten wire. The chamber is a cube of 20 cm dimension. Positive voltage is applied to wire. This chamber also has an adjustable arrangements to hold the radioactive source

ii. **High voltage power supply:** A 0-5kV supply provides the bias voltage. The supply uses a DC to DC converter to charge a Cockroft Walton multiplier circuit. The primary of the step up transformer is driven by Pulse width modulation control circuit operated at 20 KHz. The output voltage is adjusted by controlling the voltage applied to the primary of the transformer.

iii. **Pulse counter:** Whenever there is a spark in spark chamber, it draws large current from HV power supply for the duration of spark. The large current pulses are passed through a resistance mounted in series of the load, and this way corresponding voltage pulses are obtained for every spark. These pulses are amplified and fed to a pulse counter circuit.

All three parts have been integrated together and demonstrated.

6.10.5 Design of a Beta Spectrometer

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A beta spectrometer has been developed for PG teaching lab. This consists of a solenoid magnet which selects beta rays of particular energy from a source and focusses on to a detector. The source and detector are housed in a SS chamber of 1.1 m long. The system operates in vacuum of ~ 10^{-3} torr. The specifications of the spectrometer are: Rigidity of the magnet = 0.045 Kg-m, Resolution ~ 7%, transmission ~ 10^{-3}. Further work on making a complete system is going on.