University Faculty Details Page on DU Web-site

(Curriculum Vitae of Dr Suresh Kumar, Deptt of Physics & Astrophysics university of Delhi, Delhi-110007,India)

Title	Dr.	First Name	SURESH	Last Name	KUMAR	Photograph
Designation	**Associate Professor**					
Department	Physics and Astrophysics					
Address (Campus)	University of Delhi, Delhi-110007					
(Residence)	5/16, University Road, University of Delhi, Delhi -110007					
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Web-Page						

Education

Subject	Institution	Year	Details
B.Sc.(Non-Med.)	Himachal Pradesh university Shimla-5	2000	Physics, Chemistry, Math. Marks 79.88 %, 6th Rank in University
M.Sc. (Physics)	Himachal Pradesh university Shimla-5	2002	Special Emphasis on: Nuclear and Particle Physics, Particle and Astrophysics, Condensed Matter Physics Marks 70.61 % and Gold Medal (1st Rank in University)
Pre-Ph.D.	Indian Institute of Technology Roorkee	2004	Advance Quantum Mechanics Advance Classical Mechanics Garde 7.5/10
Ph.D.	Indian Institute of Technology Roorkee	2007	Subjects: Nuclear Structure Thesis topic: "Study of Shape effects and Magnetic rotation in N=79 and 47 nuclei"

Career Profile

Organisation / Institution	Designation	Duration	Role
Indian Institute of Technology Roorkee	Senior Research Fellow, **Council of Scientific and Industrial Research (**Govt. of India):	April 2007 to March 2008.	Teaching and Research
Indian Institute of Technology Roorkee	Senior Research Fellow, **Ministry of Human Resource Development** (Govt.	January 2005 to December 2006	Teaching and Research

	of India):		
Indian Institute of Technology Roorkee	Junior Research Fellow, **Ministry of Human Resource Development (**Govt. of India)	January 2003 to December 2004.	**Teaching and Research**
Nuclear Engineering Division, Argonne National Laboratory, USA	**Research Associate**	25 November, 2013 to 22 November 2014	**Research** **(On study leave from University of Delhi)**
Department of Physics and Astrophysics, University of Delhi	**Assistant Professor**	28 April 2008 To 27 April 2020	**Teaching and Research**

Research Interests / Specialization

Experimental Nuclear Physics, Phenomenological Theoretical Calculation and Nuclear Data Compilation

Nuclear Structure using gamma-ray spectroscopy with INGA/GDA Clover detectors: Magnetic Rotation, Magnetic Rotation Band Crossing, E(5) symmetry etc

Theoretical explanations of MR bands using Tilted Axis Cranking (TAC) calculations.

Semi-classical Model form MR band-crossing.

Empirical evidences for deformed magic number by analyzing the "Table of Super deformed band"

Nuclear Data evaluation and Data compilation of A=109, 221, 215,217 mass chain.

Radiation Protection and Nuclear Safety

Research Experience and Training

Experimental Nuclear Structure

Experimental nuclear structure studies at Accelerator Facilities at TIFR, Mumbai, VECC Kolkata and IUAC, New Delhi, India to search Magnetic Rotation (MR), shape coexistence and influence of proton on MR Crossing.

Theoretical Calculations Using Tilted Axis Cranking (TAC) Model

Titled axis cranking calculations were carried out in A=80, 110 and 135 mass regions.

Eur. Phys. Journal A, 53, 25 (2017): *Magnetic Rotation in the Dipole bands of Transitional Strontium isotopes near N=50 shell closure.*

Nucl. Phys. A955, 1 (2016): *Polarization measurements and high-spin states Sr-86.*

Phys.Rev. C 92, 054325 (2015): *Negative-parity high-spin states and a possible magnetic rotation in* ^{135}Pr

Phys.Rev. C 85, 014327 (2014) - *High Spin Band structure of* ^{85}Sr

Phys.Rev. C 85, 014327 (2012) - *Small quadrupole deformation for the dipole bands in 112In*

Phys. Rev. C 85, 057301 (2012) *Shears mechanism in 109In*

Phys. Rev. C 84, 041301 (2011) (Rapid Communication)- *Structural change of the unique-parity πh11/2⊗νh11/2 configuration in 134Cs*

Phys.Rev. C 81, 067304 (2010)- *Band structure and shape coexistence in 135Ba*

Phys.Rev. C 81, 054322 (2010)- *High spin spectroscopy and shears mechanism in 107In*

Phys.Rev. C 80, 014320 (2009)- *High spin states in* ^{139}Pm

Phys.Rev. C 76, 014306 (2007)- *High spin structure of 139Nd*

INDIAN NATIONAL GAMMA ARRAY (INGA) 24 clovers
2005- Present
Member of PICC since 2008

I) PARTIAL INGA COLLABORATIONS (DURING 2005-2008) : In between the various phases of INGA the various collaborating institutes would pool up the available resources and perform experiments preserving the spirit of national collaboration. At Tata Institute of Fundamental Research (TIFR) Mumbai, Seven clovers array was setup in collaboration with Saha Institute of Nuclear Physics (SINP) Kolkata, UGC-DAE CSR-Kolkata , Inter University Accelerator Centre (IUAC) Delhi, Variable Energy Cyclotron Centre (VECC) Kolkata and Indian Institute of Technology Roorkee- 5 experiments were performed.
II) INGA-PHASE 04 (DURING 2008-2010) : The complete INGA array was installed in the new beam hall at IUAC, New Delhi in 2008. The early implementation of this phase had about 18-20 Clover detectors. Experiments were performed in two phases and in all about 30 experiments have been successfully completed.
III) INGA- PHASE 05 (DURING 2011 to 2014) : 24 Clovers setup. about 35 experiment has been performed at TIFR/BARC Pelletron Laboratory.
IV) INGA- PHASE 06 (DURING July 2016 to 2016) : 14 Clovers setup. about 12 experiment has been performed at IUAC, Pelletron Laboratory.

RADIATION DETECTORS

HPGe & Clover Detectors, Highly segmented Ge CLOVER Detectors; Planar Detector , Scintillation Detectors (LaBr3(Ce), BGO, NaI, CsI), Nuclear Lab set-up of Nuclear Engineering Course

NUCLEAR DATA

Nuclear Structure and Decay Data Evaluation – ENSDF, XUNDL etc

Nucl. Data Sheets **108**, 883 (2007) - **A = 221**
Nucl. Data Sheets **114**, 2023 (2013) - **A = 215**
Nucl. Data Sheets **137**, 1 (2016) - **A = 109**
Nucl. Data Sheets **147**,382(2018)- **A = 217**

Evaluator in International Network of Nuclear Structure and Decay Data (NSDD), Nuclear Data Services, International Atomic Energy Agency (IAEA), Vienna Austria.

NUCLEAR RADIATION SAFETY & HANDLING

Handling of radioactivity and its waste management, segregation of radioactivity and its transportation. Training course form AERB for practical handling of the nuclear waste & attended ICTP school on Nuclear Security-2011. Nuclear Security Course revision workshop 2017

Radiation Professional (Nuclear safety and Security)

COMPUTER SKILLS : Well versed with MS-Office and **Linux** system and AWK programming, Programming knowledge: BASIC, **FORTRAN,** Mathematic**a Graphics**: MS Excel, Origin 6.1, Sigma Plot, **Mathematica**, Gnuplot, **Latex** and Xmgrace.

LANGUAGES KNOWN English and Hindi **–writing as well as reading**

PRACTICAL TRAINING :

Participated in training course on **"Radiation Safety Aspects of use of ionizing Radiation in Research application"** during 01- 03 December 2010 at Delhi university Attended **Orientation Programs and Refresher**

Courses" emphasis on inculcation of certain teaching, research and managerial skill for career development as recommended by University Grant Commission.

Participated in International workshop **"Nuclear Structure and Decay Data: Theory and Evaluation" Year 2006, 2016.** ICTP, Trieste, Italy.

Worked as **Project student in Experimental Gamma Spectroscopy** at TIFR, Mumbai –October 2005-September 2006 under Dr R. Palit, Reader, Department of Atomic and Nuclear Physics.

Teaching Experience (Courses Taught)

@ Delhi University 2008 Onwards:

Nuclear Physics-1 Group B XI (c) for M.Sc. Physics (Final) - Theory course (02 Times)

Nuclear Physics -PHYS 517 for M.Sc. Physics (Final)- Theory course (Five Times)

Nuclear Physics-PHYS 537 for M.Sc. Physics (Final)-Theory course (Three times)

Experimental Nuclear Physics Practical -PHYS 518 for M.Sc. Physics (Final) (six times)

Solid state & Optics Lab for M.Sc. Physics (Previous) (02 times)

Electronic & Nuclear Lab for M.Sc. Physics (Previous) (02 times)

Quantum Mechanics -II , PHYS-406 (core) (02 times)

Quantum Mechanic -I, PH-CP-402 (core) (01 Time)

Radiation Safety PH-OT-541 (open elective) (01)

Applied Thermodynamics-605 for MTech. in NST - Theory course (02 Times)

Experimental Practical Laboratory-1 for MTech. in Nuclear Science & Technology (02 times)

@ Indian Institute of Technology Roorkee (2003-2008):

M. Sc. Nuclear Physics (Previous & Final) Laboratory

B. Tech. I Tutorials Physics course-I and II and Experimental Laboratory

Participation in New Course Development: Radiation Safety (Open Elective)

& Nuclear Safety and Security (Elective)

ACEDEMIC & OTHER ACTIVITIES

ACEDEMIC

Member of Department Executive Council (EC) 2008-2009, Department of Physics & Astrophysics, University of Delhi
Member of Time-Table Committee, 2008-2009, 2010-2011 Department of Physics & Astrophysics, University of Delhi
Member of Department Research Council (DRC), 2010-2011, Department of Physics & Astrophysics, University of Delhi
Member of Committee of Courses, 2010-2012, 2017-2019 University of Delhi
Member of Admission Committee 2010 onwards except 2014

Member of write-off Committee, 2011- till, Department of Physics, University of Delhi,

Member of Board of Research Studies (Sciences),2012-14, University of Delhi
Member of Faculty of Science,2015 -2018, University of Delhi
Member of write off commitee,2015-2019, University of Delhi
Member of PICC, Indian National Gamma Array, 2008-till, INDIA

Public Service / University Service / Consulting Activity

Department Representative for **"Delhi University Smoke Free Project"** during 2008-2009 Department of Physics and Astrophysics, University of Delhi, Delhi.
Department Representative for **Educational Tour to IUCCA, NCRA and GMRT,** Pune organized by Department of Physics and Astrophysics, University of Delhi, 1 -9 January, 2009
Vice President in Physics Association 2004-05, Deptt. of Physics, IIT Roorkee
*Participation **in*** **National Cadet Core** (N.C.C.) A Certificate 1995, **National Service Scheme (N.S.S)-**attended N.S.S Camp from 27th –30th December, 1999 under the theme of *"Youth For Healthy Society"* and got the Best Volunteer N.S.S. College Color. **Entrepreneurship Awareness Camp** from 30th August–1st September, 1999 organized by STEP Himachal Pradesh Shimla-5.
Science Exhibition *during Golden Jubilee Celebration* in 1999 at Vallabh Govt. College Mandi, HP
Student Editor for Science Section of the Magazine *"VIPASA"* Session 1999-2000 Vallabh Govt. College Mandi (H.P.).

TALKS

1. **Advancement in Nuclear Detectors for Nuclear research and Education,** *National Conference on Advance Materials and Nuclear Science (AMNS- 2020)*, Department of Physics, Central University of South Bihar, Gaya, INDIA.
2. **Investigation of triaxiality in the Ba Nuclei near N=82 shell closure**, *DAE symposium on Nuclear Physics 2019*, Lucknow university Utter Pradesh, India.
3. **Mayapuri Co-60 Radioactive Accident: Overview and lesson learned**, *Training Course on Nuclear Security*, PDPU, Gujarat 4-6 September 2019.
4. **Polarization Asymmetry Measurement of intermediate States in the Xe, Ba and Sr Nuclei near the N=82 and 50 Shell Closures**, **INGA Workshop 2019**, IUAC, New Delhi, India Sept 2019
5. **Nuclear Security in the context of detection instrumentation,** *WINS Academy Training course for Scientists, Technicians and Engineers on Nuclear Security*, 25-27 September 2018, Amity University India
6. **Reinforce in low and intermediate states of the beta stable Ba and Xe nuclei near N=82 shell closure,** *Frontiers in Gamma-ray spectroscopy (FIG2018)* ,Tata Institute of Fundamental Research (TIFR) Mumbai, India during 12-14 March 2018.
7. **Glimpse of quantum structure in nuclei**, *Visitors Programme 2018*, Department of

Physics and Astrophysics, University of Delhi, New Delhi India

8 **Importance of nucleon in the coupling mechanism to explore the nuclear structure of nearly deformed nuclei**, *International Conference in Nuclear Physics with energetic Heavy Ion beams*, Department of Physics, Panjab University Chandigarh, 15-18 March, 2017.

9 **Looking inside a nucleus using Indian National Gamma-Array (INGA)**, Workshop on Frontiers in Physics, Department of Physics, HPU, Shimla, 17-18 March, 2017

10 **Beautiful Phase of Nuclear Rotation in Transition Nuclei; a competition between special coupled system and collective**, *Recent Trends in Nuclear structure and its implication in Astrophysics*" IOP Bhubaneswar, Puri India, 04-08 January, 2016.

11 **Tilted Axis cranking**, *Experimental Techniques in Gamma Spectroscopy (School),* IUAC, New Delhi India, 25-29 April, 2016

12 **Spin and Parity Assignment of Nuclear States**, *2nd DAE BRNS ENSDD Workshop*" HBCSE-TIFR, Mumbai India, 29-04 March, 2016

13 **Magnetic Rotational Band crossing in A=135 and 110 region-role of nucleons in MR band crossing**, *"Frontiers in Gamma-ray spectroscopy FIG12***"** , Inter University Accelerator Centre (IUAC), Delhi India, 16-22 March 2012.

14 **Transitional Nuclei A=130 region: E(5) dynamical point symmetry**, *FROINTER IN GAMMA RAY SPECTROSCOPY (F1G09***),** TIFR, Mumbai India, March 02-04 2009

15 **Transitional Nuclei** *"Nuclear Yrast and Near Yrast States –YRAST, 09"* Department of Physics, Indian Institute of Technology Roorkee -247667, Oct 24-30, INDIA-2009

16 **Gamma-ray spectroscopy; Planning of an experiment in Nuclear physics**, Summer School, BHU, Varanasi India, 12-16 Sept 2011

17 **Analysing Nuclear Experiments**, SERC School, IIT Roorkee, Roorkee India, 20-24 Feb 2012

18 **Transitional Nuclei: High spin states and critical behaviour**, *DAE Nuclear Physics Symposium 2008, IIT Roorkee*, Roorkee India, 21-26 December, 2008

19 ***Half life measurement of 27/2- negative parity baldhead state of a Magnetic Rotational band in ^{197}Pb,*** *"Nuclear Structure and Decay Data: Theory and Evaluation"* Miramare (ICTP) -Trieste, Italy, 20th February-3rd March, 2006

20 ***Superdeformed Magic numbers: Empirical evidences,*** SERC School **"Mean field description of Nuclei",** I.I.T Bombay, Mumbai India, 15th March –03rd April, 2003

Honors & Awards

- Gold Medal for getting First position in M. Sc. Physics-2002 in Himachal Pradesh University.
- Merit's Certificate in B. Sc. 2000 getting 6th position in Himachal Pradesh University.
- Merit's certificate in Metric and +2 in Himachal Pradesh Board of School Education, Dharamshala
- Senior Research Fellow, Council of Scientific and Industrial Research (Govt. of India): April 2007 to March 2008.
- Senior Research Fellow, Ministry of Human Resource Development (Govt. of India): January 2005 to December 2006.
- Junior Research Fellow, Ministry of Human Resource Development (Govt. of India): January 2003 to December 2004.

- Indo-US Research Fellow, Indo-US Science & Technology Forum, 25 November 2013 to 22 November 2014.

CONFERENCES/SEMINAR/WORKSHOP ORAGANISTION

Member of local Organizer committee

Orientation Programme and public lecture on " Nuclear Energy for National Development" held on 20th October 2010 at Department of Physics & Astrophysics, University of Delhi, INDIA
DAE Symposium on Nuclear Physics to be held during 2nd to 7 Dec. 2012 at University of Delhi INDIA

DAE Symposium on Nuclear Physics held during 21- 26 December at Indian Institute of Technology Roorkee, INDIA.
International Conference on Electroceramics (ICE-2009) held during December 13-17, 2009 at University of Delhi, INDIA
International Conference and Workshop on Nanostructured Ceramics and other Nanomaterials (ICWNCN) was organized during March 13-16, 2012 at University of Delhi, INDIA.
WAMFER 2012 - Workshop on Advanced Materials for Future Energy Requirements to be held 29 Nov – 1 Dec. 2012 at University of Delhi, INDIA
School cum Workshop on "Nuclear Yrast and Near Yrast States – YRAST,09" held during Oct 24-30, 2009 at IIT Roorkee , INDIA
Workshop on "Frontiers in Gamma-ray spectroscopy" held during March 02-04, 2009, at TIFR, Mumbai, INDIA
Workshop "Shell Model to Effective Field Theory: *Lectures on Current Trends in Nuclear Physics" held on* 28th April, 2006 at TIFR, Mumbai, INDIA
International workshop "Nuclear Structure Physics at the extreme: New directions" held during 21-24 March, 2005 at Himachal Pradesh University Shimla, INDIA.
International Workshop on Theoretical High Energy Physics (IWTHEP) held during 15th-20th March, 2007 at IIT Roorkee, INDIA

Research Guidance

A Ph.D, Students

S.N.	Name	Title	Date of Registration	Status
1.	Ritika Garg	*Magnetic Rotation and Magnetic Rotational Band Crossing in A=135 region.*	Sept 2007	Awarded 2016
2.	Naveen Kumar	*Nuclear Structure in Transitional Strontium (Sr) Nuclei Near Shell Closure N=50.*	Feb 2011	Awarded 2017
3.	K. Rojeeta	*High Spin Features of Nuclear Structure in Mass A=130 Region*	Oct. 2012	Awarded 2019
4	Neelam	Study of the Transitional 134Ba and 132Xe Nuclei using In-beam gamma-ray spectroscopy	Oct. 2014	Awarded 2021
6.	Anuj	Nuclear structure around mass	Feb 2018	In Progress

		A=80.		
7	Prerna Singh Rawat	Octupole Isomers and Quardrupole-octopole mixing	Feb 2020	In Progress
7	Nadini Patel	Investigation of Transition Probabilities for Isomeric states.	Jan 2021	In Progress
8	Ankur Sharma	Investigation of triaxial shape	Feb 2021	In Progress

B. M.Sc./B.Sc. Students (Dissertation/Summer projects)

S.N.	Name	Title	Year	Status
1.	Ms Jasneet Kaur & Mr Sushil Kumar (M.Sc) Department of Physics & Astrophysics, University of Delhi	CHARACTERISTICS OF HYPER-PURE GERMANIUM (HPGe) CLOVER DETECTOR (INGA 2008 ARRAY)	April-July 2008	Completed
2.	Ms Debnandini Mukherjee (B.Sc.)Hindu College, University of Delhi	Detection of gamma photon using scintillation Detector	April-July 2008	Completed
3.	Ms Jasmeet Kaur & Rajbir kaur (M.Sc.) Department of Physics & Astrophysics, University of Delhi	Efficiency and Addback factor for the INGA 2010.	April-July 2010	Completed
4.	Mr Umesh Kumar Department of Physics & Astrophysics, University of Delhi	Study of fission fragment yield populated by multi-fragmentation reaction	Jan-April 2011	Completed
5.	Ms Lalita Devi Department of Physics & Astrophysics, University of Delhi	GAMMA RAY SPECTROSCOPY OF ^{133}Xe AND ^{136}Ba POPULATED BY FUSION EVAPORATION REACTION	Jan-April 2011	Completed
6.	Ms Bharati Jaiswal Department of Physics & Astrophysics, University of Delhi	Study of Characteristics of La2Br3Ce Scintillation Detector	Jan-April 2011	Completed
7.	Anuj Nigam, Debmalya Ganguly Meka Uma Reddy PM Dimensions Pvt. Ltd	Radiation Detectors for nuclear safety aspects	October – December 2011	Completed
8	Ms Jyoti Sharma Department of Physics & Astrophysics, University of Delhi	Study of spin and parity of nuclear states	Jan-April 2012	Completed
9.	Ms Anshu Department of Physics & Astrophysics, University of Delhi	Study of polarization asymmetry ---single and integrated clover detectors for TIFR INGA	Jan-April 2012	Completed
10.	Mr Rahul Yadav Department of Physics & Astrophysics, University of	Lifetime measurements of nuclear state using pulse beam and centroid shift method	Jan-April 2012	Completed

	Delhi			
11	Ms Neelam Department of Physics & Astrophysics, University of Delhi	Study of nuclear excited states using neutron capture (n,γ) reaction.	Jan-April 2013	Completed
12	Mr Raj Kumar Department of Physics & Astrophysics, University of Delhi	Calculation of single particle energy state using Woods-Saxon potential in shell model	Jan-April 2013	completed
13	Ms Sayna Matta Department of Physics & Astrophysics, University of Delhi	Nuclear Structure via Gamma-ray Spectroscopy	Jan -April 2016	Completed
14	Mr Harsh Kumar Department of Physics & Astrophysics, University of Delhi	In-beam spectroscopy and cross-section measurement in A~130 mass region.	Jan -April 2017	Completed
15	Ms Tanya Singh Department of Physics & Astrophysics, University of Delhi	Cross-section measurement and identification of nuclei in the 130Te(9Be,xyn) reaction	Jan-April 2019	Completed
16	Ms Simran rani Department of Physics & Astrophysics, University of Delhi	Measurement of DCO ratio and polarization asymmetry of the gamma-rays from the ^{135}Ba nucleus.	Jan-April 2019	Completed

Research Collaborations

Dr. Rudrajoyti Palit, Department of Nuclear & Atomic Physics, Tata Institute of Fundamental Research

Prof. H.P. Sharma, Department of Physics and Astrophysics, Banaras Hindu University, Varanasi

Dr PC Srivashatva and Dr. Ajay Deo, Department of Physics, IIT Roorkee, Roorkee

Research Projects

Sponsored Projects completed as PI

S.No	Title of Research Project	Major/ Minor	Period	Total Grants sanctioned & received (in rupees); Name of the Funding Agency	National/ Inter-national
1.	Magnetic Rotational Band crossing...near A=135	Major	2009-2012	Approx. 6.0 Lakhs UGC-DAE Consortium for scientific Research Kolkata Centre	National

2	Study of near transitional nuclei: low spin states, Isomers and Critical Point symmetry	Major	2012-2017	Approx. 6.03 Lakh Inter-University Accelerator Centre, New Delhi	National
3	R & D Doctoral Research Programme	Minor	2010-11	2.5 Lakh University of Delhi	National
4	R & D Doctoral Research Programme	Minor	2011-12	2.3 lakh University of Delhi	National
5	R & D Doctoral Research Programme	Minor	2012-13	2.5 lakh University of Delhi	National
6	R & D Doctoral Research Programme	Minor	2014-15	1.25 lakh University of Delhi	National
7	R & D Doctoral Research Programme	Minor	2015-16	3.00 lakh University of Delhi	National

Sponsored Projects completed as Co-PI/Joint-PI

S.No	**Title of Research Project**	**Major/ Minor**	**Period**	**Total Grants sanctioned & received (in rupees); Name of the Funding Agency**	**National/ Inter-national**
1.	Resistive Plate Chamber, Development, Fabrication & Testing and Neutrino Simulation studies for INO-*ICAL Experiments*	Major	2010-11	12.94 Lakhs Department of Science and Technology. SERC Division, Govt of India	National
2.	R & D Efforts by University groups for INO Project"	Major	2013-2018	177.80 Lakhs Department of Science and Technology. SERC Division,	National

				Govt of India	

Sponsored Projects in progress as PI

S.No.	Title of Research Project	Major/ Minor	Period	Total Grants sanctioned & received (in rupees); Name of the Funding Agency	National/ Inter-national
1.	Investigation of the High-Spin states in the A= 85 mass region using In-beam Gamma-ray Spectroscopy	Major	2017 onward	Approx. 6.0 Lakhs Inter-University Accelerator Centre, New Delhi	National
2.	Search for large Octupole collectivity and high spin isomers near N=126 shell closure	Major	2019 onward	Approx. 13.0 Lakhs UGC-DAE Consortium for scientific Research Kolkata Centre	National
3.	R & D Doctoral Research Programme	Minor	2020 -21	2.5 Lakhs University of Delhi	National

List of Publications

Publications in Refereed Journal [Year till date to Year 2006]

1. *Probing entrance channel effects in fusion-fission dynamics through neutron multiplicity measurement of* ^{208}*Rn*, Neeraj Kumar, Shashi Verma, Shabnam Mohsina, Jhilam Sadhukhan, K. Rojeeta Devi, A. Banerjee, N. Saneesh, M. Kumar, Ruchi Mahajan, Meenu Thakur, Gurpreet Kaur, Anjali Rani, Neelam, Abhishek Yadav, Kavita, Rakesh Kumar , Unnati , S. Mandal , **Suresh Kumar**, B.R. Behera , K.S. Golda , A. Jhingan, P. Sugathan,.
   Physics Letter B **814**, 136062 (2021) [Impact Factor = 5-6].
2. *Structure of positive parity states in 139Pm.* . S. S. Tiwary, H. P. Sharma, S. Chakraborty, C. Majumder, A. Gupta, Swati Modi, P. Arumugam, P. Banerjee, S. Ganguly, K. Rojeeta Devi, Neelam, **S. Kumar**, S. K. Chamoli, A. Sharma, V. V. Jyothi, Mayank, A. Kumar, S. Bhattacharjee,Indu Bala, S. Muralithar and R. P. Singh,
   Physica Scripta **95**, 095304 (2020) [Impact Factor = 1-2] .
3. *Indication of gamma-vibration in* ^{123,125,127}*I*, S Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, P. Banerjee, S. Ganguly, **S. Kumar**, A. Kumar, A. Kumar, R. P. Singh and S.

Muralithar,

Journal of Physics G: Nuclear and Particle Physics, **47,** 095104 (2020) Impact Factor = 2.777] .

4. *Multiphonon longitudinal wobbling in ^{127}Xe* ,S Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, A.K. Gupta, P. Banerjee, S. Gaguly, S. Rai, Pragati, Mayank, **S. Kumar**, A. Kumar, R. Palit, S. S. Bhattacharjee, R. P. Singh and S. Muralithar.

   Physics Letter B **811**, 135854 (2020) [Impact Factor = 5-6].

5. Gamma-vibration in ^{126}Xe-revisit, S Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, P. Banerjee, S. Ganguly, S. Rai, Pragati, Mayank, **S. Kumar**, A. Kumar, R. Palit, S. S. Bhattacharjee, R. P. Singh and S. Muralithar,

   Nucl. Phys. A, **996,** 121687 (2020). [Impact Factor = 1.5-2.0]

6. Signature splitting in the positive parity bands of ^{127}Xe. S Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, P. Banerjee, S. Ganguly, S. Rai, Pragati, S. Modi, P. Arumugam, Mayank, **S. Kumar**, A. Kumar,, S. S. Bhattacharjee, R. P. Singh and S. Muralithar, European Physical Journal A, **56**, 50 (2020). [Impact Factor = 2.4-2.8]

7. *Intermediate structure and dipole bands in the transitional ^{134}Ba nucleus,Neelam* **Suresh Kumar,** et al.

   Phys. Rev. C **101,** 014312 (2020). [Impact Factor = 3.3-3.9]

8. *Fabrication of the gold (Au) backed ^{130}Te targets for in-beam gamma-ray spectroscopy*, Neelam , **Suresh Kumar**, S.R. Abhilash, G.R. Umapathy, D. Mehta,

   Vacuum , 170, 108961(2019)[Impact Factor = 2.0-2.5]

9. *Observation of quasi-gamma bands in Te nuclei*,
   S. S. Tiwary, H. P. Sharma, S. Chakraborty, C. Majumder, G. H. Bhat, J. A. Sheikh, P. Bane erjee, S. Ganguly, S. Rai, Pragati, Mayank, **S. Kumar**, A. Kumar, S. S. Bhattacharjee, R. P. Singh and S. Muralithar,

   European Physical Journal A, **55**, 163 (2019). [Impact Factor = 2.4-2.8]

10. *Fabrication of isotopic ^{127}I target from potassium iodide for heavy ion nuclear reactions*, S.S. Tiwary, H.P. Sharma, S. Chakraborty, C. Majumder, Gurjot Singh D. Mehta, **S. Kumar**, S.R. Abhilash, D. Kabiraj, R.P. Singh, S. Muralithar,

    Vacuum, **167**, 336 (2019). [Impact Factor = 2.0-2.5]

11. *Evolution of collectivity and evidence of octupole correlations in ^{73}Br*, S. Bhattacharya, T. Trivedi, D. Negi,R. P. Singh, S. Muralithar, R. Palit, I. Ragnarsson, S. Nag, S. Rajbanshi, M. Kumar Raju, V. V. Parkar, G. Mohanto, **S. Kuma**r, D. Choudhury, R. Kumar, R. K. Bhowmik, S. C. Pancholi, and A. K. Jain,

    Phys. Rev. C **100,** 014315 (2019). [Impact Factor = 3.3-3.9]

12. *Observation of rotation about the longest principal axis in ^{89}Zr*, S. Saha, R. Palit, J. Sethi, S. Biswas, P. Singh, S. Nag, A. K. Singh, I. Ragnarsson, F. S. Babra, U. Garg, A. Goswami, E. Ideguchi, H. C. Jain, **S. Kumar**, Md. S. R. Laskar, G. Mukherjee, Z. Naik, and C. S. Palshetkar,

    Phys. Rev. C, **99**, 054301 (2019).[Impact Factor = 3.3-3.9]

13. *Search for the 23/2+ isomeric state in ^{125}Te*, S. Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, P. Banerjee, S. Ganguly, S. Rai, Pragati, Mayank, **S. Kumar**, A. Kumar, S. S.

Bhattacharjee, R. P. Singh and S. Muralithar,

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13. *Band Structure of* ^{85}Sr , **S.Kumar**, S.K.Mandal, A.K.Jain, L.Chaturvedi, R.K.Sinha, D.Negi, A.Dhal, R.Kumar, R.P.Singh, S.Muralithar, R.K.Bhowmik, S.C.Pancholi, AIP Conf. Proc. 1304 375 (2010).
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5.*Revisiting isomeric state in* ^{215}Fr, **S. Kumar** in Khamosh Yadav et al.., DAE Nuclear Physics Symposium,Vol. 64, 206 (2019)
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15. *Transitional probability ratios of dipole bands in* ^{129}La, S. Kumar in K. Rojeeta Devi et al., DAE Nuclear Physics Symposium,Vol. 63, 316 (2018).
16. *Search for octupole correlation in* ^{73}Br, S.Kumar in Sutanu Battacharya et al., DAE Nuclear Physics Symposium,Vol. 63, 318 (2018).
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27. *Study of $vh_{11/2}$ band in ^{127}Xe,* S.Kumar in S. Chakraborty et al., DAE Nuclear Physics Symposium,Vol. 61, 278 (2016).

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39. *Mixing Ratio of gamma-rays in ^{85}Sr nucleus from the R_{dco} and polarization asymmetry measurements,* S. Kumar in Neelam et al., DAE Nuclear Physics Symposium,Vol. 60, 236 (2015).

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49. *Ground state Lifetime Correlation with NpNn/[NpNn]* $_{MAX,}$ S. Kumar in V. Kumar et al., DAE Nuclear Physics Symposium,Vol. 57, 380 (2012).

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53. *Structure of ^{108}Ag at Low and Medium Spin,* S. Kumar in J. Sethi et al., DAE Nuclear Physics Symposium,Vol. 57, 360 (2012).

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71. *High spin structures in ^{109}In,* S. Kumar in D. Negi *et al.,* DAE Nuclear Physics Symposium,Vol. 55, 48 (2010).

72. *Nuclear Structure in ^{98}Tc:Linear Polarization and DCO ratio measurements.,* S. Kumar in R.Shinha *et al.,* DAE Nuclear Physics Symposium,Vol. 55, 42 (2010).

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76. *High spin structure of ^{130}Ba,* S. Kumar in Amandeep Singh et al. DAE Nuclear Physics Symposium,Vol. 54, 84 (2009).

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81. *Transitional Nuclei: High Spin States and Critical behavior,* S.Kumar, DAE Nuclear Physics Symposium,Vol. 53, 184 (2008).

82. *Particle Identification in CsI(T1) detectors,* S. Kumar in R. Palit *et al.,* DAE Nuclear Physics Symposium,Vol. 53, 749 (2008).

83. *Preparation of Multilayer Calcium Target,* S. Kumar in D.Negi *et al.,* DAE Nuclear Physics Symposium,Vol. 53, 703 (2008).

84. *Breakup fusion in $^{6}Li+ ^{144}Sm$,* S. Kumar in P. K. Rath *et al.,* DAE Nuclear Physics Symposium,Vol. 53, *477* (2008).

85. *Suppression of complete fusion in $^{6}Li+ ^{144}Sm$,* S. Kumar in P. K. Rat*h et al.,* DAE Nuclear Physics Symposium,Vol. 53, 385 (2008).

86. *Spectroscopy of ^{37}Ar, ^{36}Cl and the role of fp orbitals,* S. Kumar in S. Ray *et al.,* DAE Nuclear Physics Symposium,Vol. 53, 353 (2008).

87. *Investigation of Positive Parity Degenerate Dipole Bands in ^{133}Ce,* S. Kumar in R. Palit *et al.,* DAE Nuclear Physics Symposium,Vol. 53, 323 (2008).

88. *High Spin States in ^{155}Ho ,* S. Kumar in G.Jnaneshwari *et al.,* DAE Nuclear Physics Symposium,Vol. 53, 271 (2008).

89. *Positive Parity High Spin States of ^{137}Pr,* S. Kumar in A. K. Jain et al., DAE Nuclear Physics Symposium,Vol. 53, 251 (2008).

90. *Structures of Dipole bands of ^{107}In,* S. Kumar in S. Sihotra et al., DAE Nuclear Physics Symposium,Vol. 53, 235 (2008).

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94. *High Spin states in ^{106}In,* S. Kumar in A. Deo et al., DAE Nuclear Physics Symposium,Vol. 52, (2007).

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96. *High Spin states in 139Pm,* S. Kumar in A. Dhal et al. DAE Nuclear Physics Symposium,Vol. 51, (2006).

97. *High Spin Structure of ^{139}Nd, S. Kumar et al.,* DAE Nuclear Physics Symposium, Vol. 51, (2006).

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99. *Half life measurements of 27/2 negative parity band head state of a mangentic Rotational band in ^{197}Pb,*

S. Kumar et al., DAE Nuclear Physics Symposium,Vol. 51, (2006).

100.*High Spin states in ^{85}Sr*, S. Kumar et al., DAE Nuclear Physics Symposium,Vol. 50,245 (2005).

101.*Nuclear Softness parameter for Superdeformed bands*, S. Kumar et al., DAE Nuclear Physics Symposium,Vol. 47B,130 (2004).

102. *Superdeforemed Magic Numbers: Empirical Evidences*, S. Kumar et al., DAE Nuclear Physics Symposium,Vol. 46B,104 (2003).

WORKSHOPS/SYMPOSIA/SERC SCHOOLS ATTENDED

1 *Frontiers in Gamma-ray Spectroscopy (FIG2018)*, Tata Institute of Fundamental Reseach (TIFR) Mumb India during 12-14 March 2018.

2 Online WGCapD Webinar Series on "Remote Sensing in Crop Monitoring and Assessment" by Indian Institute Remote Sensing (IIRS), ISRO, during 19 May to 9 June, 2020.

3 *Workshop on E-content Development and Online Pedagogy on the theme "ICT TOOLS for ONLI TEACHING"* CPDHE, University of Delhi, Delhi - 110 007, India May 23-29, 2020.

4 Two day webinar on "Human Factors, Trustworthiness and Reliability in Nuclear Complexes by Ka Kaldenbach, Human Reliability Program (HRP) Team Lead, Threat Reduction Initiatives Oak Ridge Natio Laboratory, organised by ORNL - Amity University Uttar Pradesh Remote Partnership April 27-28, 2020,

5 National Conference of Advance Material and Nuclear Science, Central university of South Bihar, Gaya, Ind 27-29 February 2020.

6 *Short Term course on Gender Sensitization*, CPDHE University of Delhi, New Delhi India, *13- February 2020.*

7 DAE Symposium of Nuclear Physics, Lucknow University, Lucknow, India 22- 27 December 2019,

8 *Training Workshop on Developing Emerging Nuclear Security Practitioners*, Gujarat, India, 20- November, 2019

9 *Training course on Nuclear Security*, Gujarat India, 4-6 September 2019,

10 IUAC school on Nuclear Reaction, IUAC, New Delhi India 15-20 July 2019

11 *Workshop on Incorporating both technical and human elements to reduce hazards and vulnerabilit in sensitive facilities*, Gujarat, India 14-16 May 2019,

12 *International school of Nuclear and Radiological leadership for safety*, Bahadurgarh, Haryana Ind 26-30, November 2018,

13 *DAE Nuclear Physics Symposium* 2017, Thapar University Patiala, 20-24 December, 2017.

14 *50 Years of Beam; exploring the nuclear frontier*, Cyclotron Institute Texas A &M University, Colleg Station, 15-17 November, 2017.

15 *Fundamentals of Radiological source security (FRSS),* Delhi Technological University and Kin college
London (KCL), 4-6 September, 2017.

16 *Nuclear Security curriculum review workshop for Indian Universities*, Amity University Uttar Pardes 1-3 June, 2017.

17 *International conference in Nuclear Physics with Energetic Heavy Ion Beams*, Panjab Univers Chandigarh,
14-18 March, 2017.

18 *A workshop on Frontiers in Physics (AWFP-2017*), Himachal Pradesh University Shimla, 17- March, 2017.

19 *Experimental Techniques in Gamma Spectroscopy (School),* IUAC, New Delhi India, 25-29 Ap 2016

20 *ENSDD week India -2016*, Mumbai India, 23-27 Feb, 2016

21 *Recent Trends in Nuclear structure and its implication in Astrophysics*" IOP Bhubaneswar, Puri Ind 04-08 January, 2016.

22 *DAE Nuclear Physics Symposium* 2015, Prasanthi Nillayam, Andhra India, 7-11 December, 2015

23 *Refresher Course in Physics*, HRDC, JNU Delhi India, 05-30 October 2015.

24 *Recent trends in nuclear Physics*, IUAC, New Delhi India, 14 -15 September 2015

25 *Gordon Research conference on Nuclear Chemistry* (International Conference), Colby Sawyer Colle New London, NH USA, May 31—June 5, 2015

26 *Nuclear Data Week 2014*, NNDC, BNL USA, 5-11 November 2014.

27 *DAE Nuclear Physics Symposium* 2012, Delhi University, Delhi India, during 7-11 December, 2012

28 *Nuclear Data decay and Structure 2012*, VECC Kolkata, 26-29 November 2012

29 *NUSTAR week 2012***,** VECC Kolkata, 05-10 November 2012

30 International Summer School for Advance Studies *"Dynamics of open nuclear systems"***,** IFIN-NH, Romania, 09-20 July 2012.

31 *"Frontiers in Gamma-ray spectroscopy FIG12***"** , Inter University Accelerator Centre (IUAC), Delhi India, 16-22 March 2012.

32 *DAE Nuclear Physics Symposium 2011*, Andhra University, Andhra Pradesh India, 26-30 December, 2011

33 *Refresher Course in Physics (RC-239),* Academic staff College Shimla India, 25 July August -13 August 2011.

34 *First International school on Nuclear Security*, ICTP Trieste, Italy, 10- 23 April 2011.

35 Training Programme on *"Radiological Safety Aspects in the Research Application of Ionizing Radiation"* University of Delhi, Delhi India, 1-3 December 2010.

36 *Orientation Course (98*), Academic staff College Shimla India, 19 August -15 September 2010.

37 Summer School of Physics 2010 on *" Exotic Nuclei and Nuclear/Particle Astrophysics (III) : From nuclei to stars***",** , Sinaia, Romania , June 20-July 3, 2010

38 *FROINTER IN GAMMA RAY SPECTROSCOPY (F1G09***),** TIFR, Mumbai India, March 02-04 2009.

39 *"Nuclear Yrast and Near Yrast States –YRAST, 09"* Department of Physics, Indian Institute of Technology Roorkee -247667, Oct 24-30, INDIA-2009

40 *DAE Nuclear Physics Symposium 2008, IIT Roorkee*, Roorkee India, 21-26 December, 2008

41 *DAE Nuclear Physics symposium 2007***,** Sabalpur University, Orrissa India, 11- 16 December, 2007.

42 *"Nuclear Structure and Decay Data: Theory and Evaluation***"** Miramare -Trieste, Italy, 20th February-3rd March, 2006.

43 *DAE Nuclear Physics symposium 2006***,** Maharaja Sayajirao University of Baroda, Vadodara India, 11- 16 December, 2006.

44 *DAE Nuclear Physics symposium 2005***,** Bhabha Atomic Research Centre, Mumbai India, 12- 16 December, 2005.

45 *"Nuclear Structure Physics at the extreme: New directions"* Himachal Pradesh University Shimla, India , 21-24 March, 2005.

46 *"Nuclear Structure & Dynamics"* VECC Kolkata, June 22-26th, June, 2005.

47 *"Relativistic Mean Field Theory*" at Institute of Physics, Bhubaneswar India, 26th –31st July 2004.

48 *DAE Nuclear Physics symposium 2004***,** Banaras Hindu University, Varanasi India, 06-10 December, 2004.

49 SERC School *"Mean field description of Nuclei"* I.I.T Bombay, Mumbai India, 15th March –03rd April, 2004.

50 Workshop on *"Physics with Indian National Gamma Array"* at IUAC New Delhi India, 16th-17th September, 2003.

51 *DAE Nuclear Physics symposium 2003***,** Bhabha Atomic Research Centre, Mumbai India, 08- 12 December, 2003.

RESEARCH PROPOSAL (FIVE YEAR)

A) Proposal for Nuclear Physics Facility for Sub-picoseconds lifetime measurements:

OBJECTIVES :

- *To characterise Fast-timing scintillator to measure lifetime and transition probabilities.*
- *Facility to explore research issues in neutron-rich nuclei*
- *Facility for experimental research to carried out in-house measurement for Master/M.Phil/Ph.D.*

research.

- *To generate trained manpower in the field of gamma-ray spectroscopy and associated data analysis techniques*

The fast-timing scintillators such as La2Br3(Ce), CeBr3 and BaF2 will be used to perform delayed coincidence gamma-ray spectroscopy (LaBr3, CeBr3) along with X-ray detection using low energy spectrometer (LEPS/HPGe), in order to measure the sub-picoseconds lifetimes. The radioactive source (such as Cf-252) and neutron source will use to produce the desire nuclei in excited states. The facility will also be able to explore the current interesting research issues in neutron-rich nuclei as well as characterization of element and radioactive substances.

B. Proposal for IAEA-Centre for Nuclear Structure and Decay Data Compilation and Evaluation:

OBJECTIVES:

- *Nuclear Data services for National and International needs.*
- *Polarization asymmetry evaluation/compilation to frame guideline for multipolarity of gamma-ray transitions. explore research issues in neutron-rich nuclei*

Nuclear Mass chains will be evaluated in the ENSDF activities under the NNDC-IAEA Network for Nuclear Structure and Decay data evaluation. The current update for nuclei will be execute/update under XUNDL activity for the use of user community through NNDC -IAEA network. It is proposed to compile and evaluate the data on polarization asymmetry/sensitivity to frame guidelines for the multipole character of gamma-ray transitions.

C) Search for large Octupole collectivity and high-spin isomer near N=126 shell closure

OBJECTIVES:

- *To investigate nuclear structure in the mass regions (A=200-230) to understand nuclear shape evolution on octupole shapes*
- *To compile/evaluate the octupole isomers to understand the quadrupole-octupole mixing.*
- *To identify and characterize the octupole isomers in terms of the single-particle orbitals-based shell and Nilsson Model*
- *To generate trained manpower in the field of gamma-ray spectroscopy and associated data analysis techniques*

In A= 215 mass region, the Fr, Ra and Ac nuclei were studied for both high spin states and yrast high spin isomers. The proton orbital above the Z=82 shell closure, the $g_{9/2}$, $f_{7/2}$ and $i_{13/2}$ give the configuration for low lying states in these isotopes and for high spin states neutron orbital near N=126 shell closure, the $p_{1/2}$, $f_{5/2}$, $p_{3/2}$,$i_{13/2}$,$g_{9/2}$ and $j_{13/2}$ have to couple with proton orbital. The nuclei around ^{208}Pb are characterized by large octupole collectivity due to the contribution of several $\Delta J=3$ particle-hole excitations available in the mass region. The enhanced E3 decay is already reported at very high-spin state of Rn near N=126, due which the isomers exits at very high excitation energy as well as high angular momentum. At high spin states, proton configurations coupled with neutron configurations to provide

this novel high spin excitation modes i.e. E3 decay.

In order to strength this large octupole collectivity in even N=124-130 at high spin (above 23/2) , it very important to explore this phenomena in the $^{211-214}$Ra and ^{215,217,219}Ac nuclei. The isomeric states are also expected to be very similar in At and Fr isotopes and have previously been studied for low spin states. The mixing of quadrupole-octupole configuration will further provide opportunities to investigate the new type of nuclear shape and their fingerprints in nuclear structure.

The ^{16,18}O pulsed/DC beam will used to study ^{215,217,219}Ac nuclei using ^{203,205}Tl (^{16,18}O,xn) reactions. The ^{204,206} Pb(^{12,13}C,xn) reactions for $^{211-214}$Ra will be use to populate the nuclear structure.

The nuclei will be selected from already known low-lying nuclear structure and extend the information for high-spin states using high fold coincidences. The assignments of the spin and parity will assign using the directional correlation orientation (DCO) and linear polarization measurements. The electromagnetic properties of the nuclear states will determine through the lifetime measurements.

The experiments will perform in the INGA and INGA-HYRA spectrometer and pulsed beam/DC from Pelletron-LINAC facility, India.

D) Transitional Nuclear spectroscopy in mass A=85 region

OBJECTIVES:

- *To investigate critical point symmetry in this mass-region*
- *To study the nuclear structure of transitional nuclei*
- *To test the JUN45 and jj44b shell-model interaction,*

The recent success in producing nuclei close to ^{100}Sn and ^{78}Ni necessitates optimizing a universal interaction involving all four-active orbital $p_{3/2}$, $f_{5/2}$, $p_{1/2,}$ and $g_{9/2}$ to understand the evolution of the nuclear orbital away from the line of stability. Recently, the high spin states of the ^{85,86}Sr nuclei with Z=38 sub-shell closure and the neutron near N=50 major shell gap have been measured by using fusion evaporation reaction and measured excited states with shell model calculations using JUN45 and jj44b interactions. The comparison indicates reasonable agreement but, also shows the scope for further improvement in the shell model interactions in this mass region.

High-spin states of the ^{84}Sr and $^{85.86}$Rb nuclei will be populate to understand the electromagnetic properties and optimize above shell model interactions. These measurements will enrich the nuclear structure information in this mass region and further help to understand the mean field of the nuclei.

The ^{85,86}Rb and ^{84}Sr nuclei, the ^{12,13}C(^{76}Ge, yxn) and ^{6,7}Li(^{82}Se, yxn) reactions will employ to investigate the nuclear structure. The nuclei will be selected from already known low-lying nuclear structure and extend the information for high-spin states using high fold coincidences. The assignments of the spin and parity will assign using the directional correlation orientation (DCO) and linear polarization measurements.

The electromagnetic properties of the nuclear states will determine through the lifetime measurements. The experiments will perform in the INGA and INGA-HYRA spectrometer and pulsed beam/DC from Pelletron-LINAC facility, India.

(**Signature of Dr Suresh Kumar)**