University of Delhi
Department of Physics and Astrophysics

1. **Name of the Department:** Physics and Astrophysics

2. **Major activities and achievements (Maximum 150 words)**

The Department continued to ensure high standards in teaching and research. The Department organized, after many years, a Refresher Course for college teachers. This program included pedagogical lectures, hands-on laboratory work and computer based sessions. Exposure lectures and visits to research laboratories also provided these teachers the glimpses and highlights of research conducted in the Department. The participating teachers from all over the country gave extremely positive feedback to this joint initiative with CPDHE. The Department organized several International and National conferences during this duration. A Visitor Program was organized in which several distinguished faculties from several branches of physics gave excellent talks. Regularly held Colloquia by eminent speakers were well received by our postgraduate and Ph.D. students. Our Department is proud to have two faculty members who are Fellows of all three National Science Academies. On the occasion of Science Day, a poster exhibition was held and children from the Delhi University schools visited the department.

3. **Outstanding Honor's/Distinctions (Maximum 5)**

I. Addie & Harold Broitman Member, Simons Center for system Biology, Institute for Advanced Study, Princeton, USA (Sanjay Jain)
II. INSA Biren Roy Memorial Award Lecture 2016 (Avinash Khare)
III. Member Scientific Advisory Committee, Inter-University Acceleration Centre (IUAC), Delhi (Vinay Gupta)
IV. Member of Indo-Japan Science Council appointed by DST India. (H. P. Singh)

4. **Research Projects (Maximum 5)**

S. No	Title of Research Project	Description	Period	Sponsor	Funding Amount
01	Fabrication and characterization of piezoelectric nanocrystals-organic hybrid sheet for energy harvesting and pressure sensor (Binay Kumar)	Research Project	3Years from Oct. 2016	SERB-DST	72 lacs
02	Flux growth of $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ (PMNT) single crystals for piezoelectric and pyroelectric applications (Binay Kumar)	Research Project	3Years From June 2015	ARMREB, DRDO	86 lacs
03	Investigation of Thermoelectric (TE) Properties of Calcium Cobalt Oxide (Ca3CO4O9) and Graphene Derivatives	Research Project	2017-2019	SSPL, DRDO	9.83 lacs

	(as nano-inclusions) for TE Generator Applications (Ajit K. Mahapatro)				
04	Synthesis and Characterization of magnetic nanoparticles for tumor treatment using magnetic fluid hyperthermia (Ajit K. Mahapatro)	Research Project	2014-2017	LSRB, DRDO	38.88 lacs
05	Tailoring of magnetic and other functional properties of thin film nanostructures using low energy ion beams (Sumalay Roy)	Research Project	2017-2019	SERB-DST	60 lacs
06	Understanding the perpetual points in nonlinear dynamical systems (Awadhesh Prasad)	Research Project	August 2016-July 2019	SERB-DST	23.75 lacs
07	Transport and dynamics of alkali ions in solid electrolytes with disordered structure (S. Murugavel)	Research Project	2014-2017	DST	48.85 Lacs
08	Investigations on nano structured Olivine phosphate cathode material for advanced energy storage applications (S. Murugavel)	Research Project	2015-2018	CSIR	56.40 lacs
09	"Compact Muon Solenoid (CMS) Upgrade, Operation and Utilization" (Kirti Ranjan)	Research Project	2014-2019	DST	9.99 Cr.
10	"Updating and Operation of Reginonal WLCG Grid System" (Kirti Ranjan)	Research Project	2014-2019	DST	25.30 lacs
11	Development of thin film Surface Acoustic Wave device as a platform for the sensing applications (Vinay Gupta)	Research Project	3 years Nov.2014-19	DST (Min. of S&T)	424.38 lacs
12	Molecular Modelling of Halons alternatives (Vinay Gupta)	Research Project	April 2015-Dec.2017	DRDO (Min of Def.)	276.07 lacs

5. Inter-institutional collaboration (Most prestigious 5)

I. Indo- US Project with Nodal Institute as Delhi University (PI H P Singh) and SUNY (Oswego), Texas A & M University, University of Florida at Gainesville and IUCAA (Pune) as partner Institutes. (H.P. Singh)
II. With Tata Institute of fundamental Research, Institute for Plasma Research, Gandhinagar. (Avinash Khare)
III. Collaborative work between DU and IGCAR. (Sevi Murugavel)
IV. Featured in Accelerator knowledge Portal, International Atomic Energy Agency, Vienna (http://nucleus.iaea.org/sites/accelerators/Pages/default.aspx) (Shyama Rath)
V. Country-wide collaboration on Compact Muon Solenoid (CMS) experiment in High Energy physics with National (TIFR, SINP, BARC, etc.) and International (CERN, Fermilab, DESY etc.) institutions (Ashok Kumar, A. Bhardwaj, B.C. Choudhary, M. Naimuddin, K. Ranjan)

6. Publications (Total number, mention only those in referred journals): 237

1. Experimental investigation on the structural, dielectric, ferroelectric and piezoelectric properties of La doped ZnO nanoparticles and their application in dye-sensitized solar cells, Goel, S., Sinha, N., Yadav, H., Joseph, A.J., Kumar, B. Physica E: Low-Dimensional Systems and Nanostructures, 91, pp. 72-81 (2017)

2. Direct coupling: a possible strategy to control fruit production in alternate bearing, Awadhesh Prasad, K. Sakai and Y. Hoshino, Scientific Reports 7, 39890 (2017)

3. Enhanced infrared-to-visible up-conversion emission and temperature sensitivity in (ER3+, Yb3+, and W6+) tri doped $Bi_4Ti_3O_{12}$ ferroelectric oxide, Renuka Bokolia, Manisha Mondal, Vineet K. Rai, and K. Sreenivas, J. Appl. Physics 121(8) 084101 (2017).

4. Targeting functional motifs of a protein family, Pradeep Bhadola and N. Deo, Phys. Rev. E 94(4-1), 042409 (2016).

5. Revisiting the Distance Duality Relation using a non-parametric regression method, A. Rana, D. Jain, S. Mahajan and A. Mukherjee, J. Cosmol. Astroparticle Phys. 07:026 (2016)

6. Observation and Structure Determination of an Oxide Quasicrystal Approximant, S. Förster, M. Trautmann, S. Roy, W. A. Adeagbo, E. M. Zollner, R. Hammer, F. O. Schumann, K. Meinel, S. K. Nayak, K. Mohseni, W. Hergert, H. L. Meyerheim, W. Widdra, Phys. Rev. Lett., **117,** 095501 (2016).

7. Non ideal behaviour of glass and crystal, Sharma, Y., Murugavel, S. J Phys.Chem. B, *121* (19) 5116−5124 (2017).

8. Ion-electron conducting polymer composites: Promising electromagnetic interference shielding material Manoj Kumar Vyas and Amita Chandra ACS Applied Materials and Interfaces, *8* (28), pp 18450–18461 (2016)

9. Nucleation controlled magnetization reversal mechanism in oriented L1 0 FeCoPt ternary alloys R Goyal, N Sehdev, S Lamba, S Annapoorni Solid State Communications 226, (2016) 44-50.

10. Lyoluminescence dosimetry of high-energy gamma radiation using MgB4O7:Mn2+ Sahare, P. D.; Srivastava, S. K., J. Radioanal. Nucl. Chem. 307 (2016) 31-36

7. Conferences organized/attended (Best 5)

International Conferences

ORGANIZED

I. International Conference on Technologically Advanced Materials & Asian Meeting on Ferroelectricity (ICTAM-AMF10), University of Delhi, Delhi, India, November 7-11, 2016 (Ajit A. K. Mahapatro**)**

II. XXII DAE-BRNS HEP Symposium, December 2016 (Mohamad Naimuddin)

ATTENDED/PARTICIPATED

I. EMSI International Conference 2017, Confluence Banquets & Resorts, Mahabalipuram 603104, Tamilnadu, India, July 17-19, 2017 (Ajit A. K. Mahapatro**)**

II. Invited talk in 25th AACGE Western Section Conference on Crystal Growth & Epitaxy, June 12-15, 2016, in California, USA (Binay kumar)

III. Invited talk in Asian Conference on Solid State Ionics (ACSSI-2016) held in IIT Patna during 27-30 November, 2016. (S. Murugavel)

IV. Invited talk in Tilted Axis cranking, Experimental Techniques in Gamma Spectroscopy (School), IUAC, New Delhi India, 25-29 April, 2016 (Suresh Kumar)

V. Invited Talk, The International Conference on Science and Technology of Synthetic Metals in 2016（ICSM2016, Guangzhou Convention Center, Guangzhou, China, June 26 – July 1, 2016 (Amarjeet Kaur)

VI. Invited Talk at International Conference in High Energy Physics (ICHEP) 2016, August 03 – 10, 2016, University of Chicago, Chicago, USA (M. Naimuddin)

National Conferences

I. Invited talk in the Sustainable Energy Technologies for Smart and Clean cities (SETS&CC) conference to be held at Tirupati, India, during July 27-29, 2016. (S. Murugavel)

II. Invited Talk, Inspire Programme, DST sponsored INSPIRE programme, SRM University, Kundli, Haryana, 20 July 2016 (Vinay Gupta)

III. Invited Talk, "Processing techniques for thin films and nanostructures", Workshop on Techniques of Material processing, Central University of Haryana, 27-29 April 2016 (Vinay Gupta)

IV. Invited Talk, "School on Experimental Techniques" at the Inter University Accelerator Center, Delhi, 28 April 2016 (S.K. Chamoli)

8. Number of Ph.D./M. Phil awarded: Ph.D.: 10; M.Phil.: Nil

9. Number of faculty Permanent/Temporary/ Ad-hoc:

April 2016**:** Permanent: 45; FRP: 02; DST INSPIRE: 4; Emeritus: 02

March 2017**:** Permanent: 44; FRP: 02; DST INSPIRE: 2; Emeritus: 01

10. Number of national journals subscribed (online + paper back version)

11. Number of international journals subscribed (online + paper back version)

12. Any other significant information

13. Name of the Contact details of Coordinator for Annual Report 2016-2017 of the Department. Prof. Sevi Murugavel; email: murug@physics.du.ac.in, Ph.:+91-9958413053 (M)

Head/Director's Signature

Seal of Department/Centre/Institutions