




## Faculty Details proforma for DU Web-site

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cc: [director@ducc.du.ac.in](mailto:director@ducc.du.ac.in))

Title	<b>Dr.</b>	First Name	<b>Supriya</b>	Last Name	<b>KAR</b>	Photograph
Designation	<b>Associate Professor</b>					
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### Educational Qualifications

Degree	Institution	Year
Ph.D.	<b>Institute of Physics (DAE), Bhubaneswar</b>	<b>1995</b>
M.Phil. / M.Tech.	<b>Institute of Physics (DAE), Bhubaneswar</b>	<b>1991</b>
PG	<b>Utkal University (Vani Vihar) Bhubaneswar</b>	<b>1989/90</b>
UG	<b>Utkal University (F.M. College) Baleswar</b>	<b>1987</b>
Any other qualification	<b>None</b>	

### Career Profile

- (1) Department of Physics & Astrophysics, University of Delhi as a Faculty Member since 2002 (18 years)
- (2) Indian Institute of Technology, Kanpur as Assistant Professor during 2001-2002 (2 years)
- (3) Chalmers Univ. of Technology, Goteborg, Sweden as (NFR) Research Associate during 1998-2000 (2 years)
- (4) University of Tokyo, Komaba, Tokyo, Japan as JSPS Post-Doctoral Fellow during 1996-98 (2 years)
- (5) Harish-Chandra Research Inst, Allahabad as a Post-Doctoral Research Associate during 1995-96 (1 year)

### Some Administrative Assignments

#### 1] Deputy Superintendent of Examinations:

- 1.1 M.Sc.-Physics and PhD course-work examination (3-times) during 2006 Nov-Dec, 2010 Nov-Dec & 2011 April-May
- 1.2 PhD Entrance Exam at DU for (SINP) Saha Institute of Nuclear Physics-Kolkata (5-times) during 2011-2015

#### 2] Member of Committees:

- 2.1 Faculty of Science since March 2018
- 2.2 Board of Research Studies (Sciences) since July 2018
- 2.3 Committee of Courses for M.Sc-Physics: 2014-16, 2017-
- 2.4 Time-Table for M.Sc-Physics since 2014
- 2.5 Departmental: Executive Committee during 2010-2012 and 2019-  
Library, TPSC (a number of times) during 2003-2012

### 3] Academic responsibilities outside Delhi University:

Refereed manuscript to Journals (EPJ-C, CQG, Pramana), External Examiner of PhD theses (8), Resource person, Confidential work at UPSC, SSC and at some Universities (M.Sc, PhD and Entrance Exams)

#### Areas of Interest / Specialization

High Energy Physics, Gravitation and Cosmology

**Keywords: Quantum Gravity, Superstrings & D-branes, Higher-forms, Non-commutative geometry:**

#### RESEARCH INNOVATIONS:

- (i) Non-perturbative quantum gravity (geometric torsion dynamics)
- (ii) Mass generation without Higgs Mechanism: a non-perturbation technique
- (iii) Cosmological pair production of universe/anti-universe (Big Bang)
- (iv) Quintessence Cosmology, Gravitational Instanton and Gravitational wave
- (v) de Sitter tunneling, black hole thermodynamics and accelerated expansion of universe
- (vi) Non-commutative space-time, New geometries and Emergent gravity

#### Subjects Taught

### 1- At the University of Delhi , Department of Physics & Astrophysics ( 2002 - till date )

#### \*PG Core courses:

- (i) Classical Mechanics ( 2003, 2004, 2005, 2006 & 2008 )
- (ii) Quantum Mechanics ( 2014, 2015 & 2016 )
- (iii) Radiation Theory ( 2002, 2003, 2004, 2005, 2008 & 2009 )
- (iv) Electromagnetic Theory ( 2009 )
- (v) Nuclear Physics (previous) Laboratory ( 2015 )

#### \*PG Special (Elective) Courses:

- (i) An Introduction to String Theory ( 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2019)
- (ii) General Theory of Relativity: GTR-I ( 2009, 2010, 2016 & 2017)
- (iii) Cosmology: GTR-II ( 2017 & 2018)
- (iv) Quantum Field Theory-I ( 2008 )
- (v) Particle Physics-I ( 2007, 2008, 2009, 2012, 2013, 2014 & 2018)
- (vi) Particle Physics-II ( 2012, 2013, 2014, 2017, 2018, 2019, 2020)
- (vii) Computer Lab (2019)

### 2- At I.I.T. Kanpur ( 2001-2002 ):

- (i) Mechanics ( 2001 & 2002 )
- (ii) Electromagnetism & Quantum Theory ( 2001 & 2002 )
- (iii) Electricity & Magnetism Lab ( 2002 )

#### Research Guidance

#### • Supervision of Doctoral Thesis:

#### 1) “String and Space-time Geometries”

*Mr. Sumit Majumdar ( CSIR Fellowship ) during 2003-2006, moved to a job*

#### 2) “Geometric Aspects of D-brane in String Theory”

*Dr. Abhishek Kumar Singh ( CSIR Fellowship ), 2008-2013, PhD awarded in 2014 March*

- 3) **“D-brane-world and String Theory”**  
*Dr. Sunita ( UGC Fellowship ) 2009-2014, PhD awarded in 2015 February*
  - 4) **“Black holes, Branes and Strings”**  
*Dr. K. Priyabrata Pandey ( Dept. Fellowship ) 2009-2014, PhD awarded in 2015 September*
  - 5) **“AdS/CFT duality and Emergent Gravity”**  
*Ms. Richa Kapoor ( CSIR Fellowship ) 2010 October-2016 (moved)*
  - 6) **“(Anti) de Sitter Black Holes in String Theory”**  
*Mr. Deobrat Singh (UGC Fellowship) since 2011, (submitted PhD thesis)*
  - 7) **“Black holes and D-brane-world Geometries”**  
*Ms. Richa ( DST Fellowship ) during 2010-2013 July (moved)*
  - 8) **“(Anti) de Sitter Vacua and D-branes in Superstring Theory”**  
*Mr. Prashant Kumar (CSIR Fellowship) 2013 August – 2015 (moved)*
  - 9) **“Some Aspects of Non-Perturbative Quantum Gravity in a Two Form Gauge Theory”**  
*Mr. Nitish (Dept. Fellowship) since 2016, (submitted PhD thesis 2020)*
  - 10) **Broad subject: “High Energy Physics and Gravitation Theory”**  
*Mr. Rohit K. Gupta (Dept. Fellowship) since 2016 Dec, in progress*
  - 11) **Broad subject: “High Energy Physics and Gravitation Theory”**  
*Mr. Jitesh Kumar (Faculty Member@ Rajdhani College) since 2017 Sept, in progress*
  - 12) **Broad subject: “High Energy Physics and Gravitation Theory”**  
*Ms. Monika (CSIR Fellowship) since 2018 Sept, in progress*
  - 13) **Broad subject: “High Energy Physics and Gravitation Theory”**  
*Ms. Pratibha (Dept. Fellowship) since 2018 Sept, in progress*
- **Advisor: UGC Post Doctoral Fellowship 2016-2021**  
*Post Doctoral Fellow: Dr. Rohit Kumar, PhD ( BHU-Varanasi )*
  - **No. of PhD course-work dissertation supervised: 15**
  - **No. of PG ( IV-semester ) dissertation supervised: 11**
  - **No. of UG dissertation (summer projects/internship) supervised: 19**

#### Publications Profile

List against each head(If applicable) (as Illustrated with examples)

#### 1. **Books/Monographs (Authored)**

**[56] Kar, Supriya.**

**2020 (Book) Non-commutative Geometry: A Perspective on String and Field Theories. Singapore: World Scientific Publication (in press)- by invitation.**

[55] Kar, Supriya.  
2017 Editor, Special Issue "Black Holes and Cosmology"  
*Journal of Astrophysics ad Aerospace Technology* (2017)

[54] **Kulshreshtha, Daya S., Supriya Kar, Vinod Nautiyal, Usha Kulshrestha and Swarnendu Sarkar, 2014 (Edited Volume)**  
**International Conference on Light-Cone Physics: Hadronic and Particle Physics, Nuclear Physics Proceedings Supplements 251-252 (2014)**

**2. Research papers published in Refereed/Peer Reviewed Journals**

[53] **Gupta, Rohit K, Supriya Kar and R. Nitish**  
**2020, Aspects of Gravitational Wave/Particle Duality:  
Bulk Torsion/Boundary Gravity Correspondence**  
**International Journal of Modern Physics D29 (2020) 02, 2050019**

[52] **Nitish, R, Rohit K. Gupta and Supriya Kar**  
**2020, Perspective of Perihelion precession in Torsion Modified Gravity**  
**International Journal of Modern Physics D (2020) 2050074, 11 pages**

[51] **Kar, Supriya, R. Nitish and Deobrat Singh**  
**2019, CFT6 Bulk/Boundary AdS<sub>5</sub> Correspondence and Emergent Gravity**  
**Physica Scripta 94 (2019) 7, 075301**

[50] **Kar, Supriya and R. Nitish**  
**2019, Mass Generation from a Non-perturbative Correction:  
Massive NS-field and Graviton in (3+1) Dimensions**  
**Progress in Theoretical and Experimental Physics 4 (2019) 043B02**

[49] *Kar, Supriya*  
2017, Towards Non-perturbation Theory of Emergent Gravity  
e-Print: arXiv:1610.07347 [hep-th]

[48] *Singh Deobrat and Supriya Kar*  
2016, Origin of dark energy in the universe: Can D-instanton be a source a quintessence?  
*International Journal of Innovative Research in Science, Engineering & Technology* 5, no.8,  
Pp:15785-15780

[47] *Kar Supriya, K. Priyabrat Pandey, Abhishek K. Singh and Sunita Singh*  
2016, Gravity dual D3-braneworld and Open/Closed string duality  
*International Journal of Innovative Research in Science, Engineering & Technology* 5, no.9,  
15926-15929

[46] *Pandey Priyabrat, Abhishek K. Singh, Sunita Singh and Supriya Kar*  
2016, Non-perturbative quantum effects in stringy degenerate geometries:  
Vacuum created pair of (DD<sup>-</sup>)3-brane by a two form  
*International Journal of Innovative Research in Science, Engineering & Technology* 5, no.10,  
17600-17614

- [45] Kar Supriya  
2016, *Quintessential Cosmology and D-instanton*  
Review article (invited),  
*Journal of Astrophysics & Aerospace Technology* (2015)
- [44] Pandey Priyabrat, Sunita Singh and Abhishek Singh and Supriya Kar ;  
2015, Quintessence and effective AdS brane geometries,  
International Journal of Modern Physics A30 (2015) 13, 1550065,  
arXiv:1405.6113 [hep-th]**
- [43] Kapoor Richa, Supriya Kar and Deobrat Singh;  
2015, *Quantum effects in topological and Schwarzschild de Sitter brane: Aspects of torsion on a pair of D4-brane/anti-brane universe*,  
*International Journal of Modern Physics D24* (2015) 02, 155015,  
arXiv:1407.7756 [hep-th]
- [42] Singh, Sunita, Priyabrat Pandey, Abhishek Singh and Supriya Kar ;  
2014, Quantum Kerr tunneling vacua on a pair of D4-brane/anti-brane:  
An emergent Kerr black hole in 5D,  
Nuclear Physics B879 (2014) 216-234, arXiv:1310.4424 [hep-th]**
- [41] Singh, Sunita, Priyabrat Pandey, Abhishek Singh and Supriya Kar ;  
2014, *Quantum Kerr(Newman) degenerate vacua in 4D on a non BPS brane*,  
*International Journal of Modern Physics A29* (2014) 1450164, arXiv:1311.3605 [hep-th]
- [40] Pandey, Priyabrat, Sunita Singh and Abhishek Singh and Supriya Kar ;  
2014, Quintessence and effective RN de Sitter brane geometries,  
European Physical Journal C74 (2014) 11, 3173, arXiv:1405.3931 [hep-th]**
- [39] Pandey, Priyabrat, Sunita Singh and Abhishek Singh and Supriya Kar ;  
2014, *Non-perturbative quantum effects in stringy degenerate geometries:  
Vacuum created pair of D3-brane/anti-brane by a two form*, arXiv: 1405.7917 [hep-th]
- [38] Pandey, Priyabrat, Sunita Singh and Abhishek Singh and Supriya Kar ;  
2013, *Emergent gravity/Non-linear U(1) gauge theory correspondence;*  
*J. of Astrophysics and Aerospace Technology* 3 (2013) 1, 10000101, arXiv;1002.3976 [hep-th]
- [37] Supriya Kar ; 2013 Editorial article  
*Non-Perturbative Quantum Gravity in Five Dimensions;*  
*Journal of Astrophysics and Aerospace Technology* 3 (2013) e106
- [36] Singh, Abhishek, Priyabrat Pandey, Sunita Singh and Supriya Kar ;  
2013, Discrete torsion, de Sitter tunneling and AdS brane:  
U(1) gauge theory on D4-brane and an effective curvature;  
Journal of High Energy Physics 1303 (2013) 033, arXiv:1303.4344 [hep-th]**
- [35] Singh, Abhishek, Priyabrat Pandey, Sunita Singh and Supriya Kar ;  
2013, Emergent Schwarzschild and Reissner-Nordstrom Black Holes in 4D:  
An effective curvature sourced by a B2-field on a D4-brane;  
Physical Review D88 (2013) 066001, arXiv: 1305.3525 [hep-th]**

- [34] Kar, Supriya., K. Priyabrat Pandey, Sunita Singh and Abhishek K. Singh.  
2010, *Gravity Dual D3-Braneworld and Open/Closed String Duality*, arXiv: 1002.1906 [hep-th]
- [33] Kar, Supriya.  
2009, *Non-commutative D-Brane World, Black Holes and Extra Dimensions*.  
*International Journal of Modern Physics A*24: 3571-3576.
- [32] Kar, Supriya.  
2006, *Noncommutative brane-world, (Anti) de Sitter vacua and extra dimensions*,  
*Journal of High Energy Physics* 0610: 052.
- [31] Kar, Supriya.**  
**2006, Tunneling between de Sitter and AdS black holes in a non-commutative D3-brane formalism, *Physical Review D*74:126002.**
- [30] Kar, Supriya. and Sumit Majumdar.**  
**2006, Non-commutative D(3)-brane, black holes and attractor mechanism. *Physical Review D*74:0606026**
- [29] Kar, Supriya. and Sumit Majumdar.  
2006, *Black hole geometries in non-commutative string theory*.  
*International Journal of Modern Physics A*21:6087-6114
- [28] Kar, Supriya. and Sumit Majumdar.  
2006, *Scattering of non-commutative strings: A Note on signature change at Planck scale*.  
*International Journal of Modern Physics A*21:2391-2403.
- [27] Jain, Pankaj., Supriya Kar and Sukanta Panda.**  
**2003, Brane production and the neutrino nucleon cross-section at ultrahigh-energies in low scale gravity models; *International Journal of Modern Physics D*12:1593-1602.**
- [26] Kar, Supriya.  
2003, *D-branes, cyclic symmetry and non-commutative geometry*,  
*Modern Physics Letters A*18:1053-1065.
- [25] Jain, Pankaj, Supriya Kar, Douglas W. McKay, Sukanta Panda and John P. Ralston.**  
**2002, Angular dependence of neutrino flux in  $KM^{*3}$  detectors in low scale gravity Model, *Physical Review D*66:065018.**
- [24] Kar, Supriya. and Sudhakar Panda.**  
**2002, Electromagnetic Strings: Complementarity between Time and Temperature, *Journal of High Energy Physics*: 0211:052.**
- [23] Kar, Supriya.  
2001, *Generalized Dirichlet Branes and Zero Modes*.  
*International Journal of Modern Physics A*1: 41-56.

- [22] Kar, Supriya.  
2000, *Non-commutativity, Zero Modes and D-Brane Geometry*,  
*Nuclear Physics B*577:171-182.
- [21] Kar, Supriya.  
1999, *Path integral formulation of Dirichlet string in general backgrounds*,  
*Nuclear Physics B*554:163-182.
- [20] Kar, Supriya. and Yoichi Kazama.**  
**1999, *Interaction of D string with F string: A Path integral formalism.***  
***International Journal of Modern Physics A*14:1531-1550.**
- [19] Kar, Supriya. 1997, *D-branes and Twelve Dimensions*,**  
***Nuclear Physics B*497:110-126.**
- [18] Kar, Supriya., Alok Kumar and Gautam Sengupta.  
1996, *Exact Type IIB Superstring Backgrounds*,  
*Physics Letters B*375: 121-126.
- [17] Kar, Supriya., Jnanadeva Maharana and Sudhakar Panda.**  
**1996, *Dualities in five-dimensions and charged string solutions*,**  
***Nuclear Physics B*465:439-457.**
- [16] Kar, Supriya., Jnanadeva Maharana and Harvendra Singh.  
1996, *S-duality and cosmological constant in string theory*,  
*Physics Letters B*374:43-48.
- [15] Kar, Supriya. and Jnanadeva Maharana.**  
**1995, *Planckian scattering of non-Abelian gauge particle*,**  
***International Journal of Modern Physics A*10: 2733-2746.**
- [14] Kar, Supriya. and Alok Kumar.  
1994, *Target space of an asymmetric chiral gauged WZW model*,  
*Modern Physics Letter A*9: 853-859.
- [13] Kar, Supriya. S. Pratik Khastgir and Gautam Sengupta.**  
**1993, *Four-dimensional stringy black membrane.***  
***Physical Review D*47:3643-3646.**
- [12] Kar, Supriya and Alok Kumar.  
1992, *Hidden isometry in a chiral gauged WZW model*, *Hep-th/9209068*
- [11] Kar, Supriya. and Alok Kumar.**  
**1992, *Target space structure of a chiral gauged Wess-Zumino-Witten model.***  
***Physics Letter B*291:246-250.**

[10] Kar, Supriya. S. Pratik Khastgir and Alok Kumar.  
1992, An Algorithm to generate classical solutions of string effective action,  
*Modern Physics Letter A7*:1545-1552.

3. a) Research papers published in Academic Journals other than Refereed/Peer Reviewed Journals:  
NONE

**b) Research papers published in Refereed/Peer Reviewed Conferences**

**[9] Singh, Abhishek, K. Priyabrat Pandey, Sunita Singh and Supriya Kar;  
2018, Cosmological Pair Creation of Universe and Anti-Universe at Big Bang,  
Springer Proceedings Physics 203 (2018) 305-308**

**[8] Singh, Sunita, Supriya Kar, K. Priyabrat Pandey and Abhishek K. Singh;  
2018, Degenerate Quantum Vacua and Kerr Family of Black Holes,  
Springer Proceedings Physics 203 (2018) 271-273**

[7] Singh, Deobrat, Richa Kapoor and Supriya Kar;  
2016, Torsion Geometries in U(1) Gauge Theory on D5-brane  
*Springer Proceedings Physics 174* (2016) 507-512

[6] Singh, Abhishek, Priyabrat Pandey, Sunita Singh and Supriya Kar .  
2014, Discrete Torsion, (Anti) de Sitter D4-Brane and tunneling  
*Nuclear Physics B Proceedings Supplements 251-252* (2014) 141-145.

**[5]. Kar, Supriya., K. Priyabrat Pandey, Sunita Singh and Abhishek K. Singh  
2011, Curved D-Braneworld Action in 4D and Black Holes.  
Proceedings of the Conference in Honour of Murray Gell-Mann's 80<sup>th</sup> Birthday: 559-566.  
Singapore: World Scientific Publication.**

[4]. Kar, Supriya., K. Priyabrat Pandey, Sunita Singh and Abhishek K. Singh.  
2011, D-Braneworld Black Holes.  
*Proceedings of the Conference in Honour of Murray Gell-Mann's 80th Birthday*: 567-574  
Singapore: World Scientific Publication.

[3]. Kar, Supriya.,  
2000, Path Integral Formalism for a Dirichlet String.  
Varmland. *Proceedings of Nordic Conference*.

**[2]. Kar, Supriya.,  
1993, Space-time Interpretations of Chiral Gauged WZW Model.  
Trieste. ICTP Proceedings of High Energy Physics & Cosmology: 412-419**

c) Research papers Published in Conferences other than Refereed/Peer Reviewed Conferences

[1]. Kar, Supriya.,  
2008, Non-commutative Braneworld and (Anti) de Sitter Black Holes,  
*Proceedings of the Workshop on Physics of Warped Extra Dimensions*: 187-192  
(IIT Khragapur)



4. **Other publications (Edited works, Book reviews, Festschrift volumes, etc.) – NONE**

Conference Organization/ Presentations (in the last three years)

List against each head (If applicable)

**Organization of a Conference:**

1. *Member, Technical Program Committee, Int'l Conference on Geometry, Topology and Applications 2016 Jan 14-16, Bangkok, Thailand*
2. *Member, Technical Program Committee, Int'l Conference on Geometry, Topology and Applications 2015 Jan 29-31, Shanghai, China*

**3. Participation in some of the Conferences in last 5-years:**

- (1) 2019 March 28-31, "Recent Developments in String Theory and Cosmology" at NISER, Bhubaneswar  
**-Invited to deliver a talk on "Shades of Quantum Gravity"**
- (2) 2018 Nov 25-30, "Recent Trends in Quantum Field Theory" at BHU, Varanasi  
**-Invited to deliver a talk on "BTZ black hole and Quantum Gravity"**
- (3) 2018 April 6-8, Int'l Conference "Recent Developments in Cosmology" at BHU, Varanasi  
**-Invited speaker**
- (4) 2017 Dec.14-15, Faculty Development Programme at Rajdhani College, University of Delhi  
**-Invited to deliver a talk on "Tensors and Geometry"**
- (5) 2017 March 6-11, School on "Computational High Energy Physics" at University of Hyderabad  
**-Resource person (delivered a set of lectures on General Relativity & Cosmology)**
- (6) 2016 Nov.06-10, Int'l Conference "New Trends in Quantum Field Theory" at BHU, Varanasi  
**-Invited speaker**
- (7) 2015 Aug 23-29, Int'l Conference "SUSY 2015" at Lake Tahoe, California, USA organized by the University of California-Davis **-invited speaker**
- (8) 2015 June 21-26, Int'l Conference "STRINGS 2015" at Bengaluru organized by ICTS-TIFR

Research Projects (Major Grants/Research Collaboration)

- (1) **DST Research Project 2003-2006: Fast Track Proposal for Young Scientists**
- (2) **DST Research Project 2010-2013**

## Awards and Distinctions

- (1) **2020, Outstanding Reviewers Award** 2019 for Classical & Quantum Gravity Journal by Institute of Physics Publication, UK
- (2) **2019 Invited to deliver two research talks** at an Int'l conference SUSY at Texas, Austin, USA
- (3) **2016, Member, Technical Program Committee**, Int'l Conference 2016 Jan 14-16 on "Geometry, Topology & Applications" at Bangkok, Thailand
- (4) **2015, Member, Technical Program Committee**, Int'l Conference 2015 Jan 29-31 on "Geometry, Topology & Applications" at Shanghai, China
- (5) **2013 Invited to author a book** "Non-commutative Geometry: Perspective in String and Field Theories" by World Scientific, Singapore
- (6) **2013-17 Editor**, HEP-The Scientific World Journal, Hindwai Publication
- (7) **2011- Editor**, Journal of Astrophysics & Aerospace Tech, LA, USA
- (8) **2010- Editor**, ISRN (Int'l Scholarly Research Network) Geometry Journal
- (9) **2002 Selected for Fast Track Young Scientists** by DST, New Delhi, India
- (10). **2000 Selected for Fast Track Young Scientists** by DST, New Delhi, India
  
- (11). **1998 NFR (Post Doctoral) Fellow** 1998-2000, Gothenburg, Sweden
- (12). **1996 JSPS (Post Doctoral) Fellow** 1996-97 and 1997-98 at University of Tokyo, Komaba, Japan
- (13). **1995 Post Doctoral Fellowship** 1995-96 at HRI (DAE), Allahabad, India
- (14). **1991 Doctoral Fellowship** 1991-95 at IoP (DAE), Bhubaneswar, India
- (15). **1990 Pre-Doctoral Fellowship** 1990-91 at IoP (DAE), Bhubaneswar, India
  
- (16). **1990 (M.Sc) and 1987 (B.Sc) University rank(s)**, Utkal University, Bhubaneswar, India
- (17). **1990 Selected for CSIR fellowship**

## Association With Professional Bodies

**Member , Indian Physics Association, Mumbai**

## Other Activities

2018 April 24, **Invited IPA Colloquium** entitled "Black Holes and Ghosts" at BHU-Varanasi

2019 April , **Seminar talk** entitled "BTZ Black Hole and Quantum Gravity" at SINP, Kolkata

Signature of Faculty Member

- You are also requested to also give your complete resume as a DOC or PDF file to be attached as a link on your faculty page.