




## Faculty Details proforma for DU Web-site

Title	<b>Dr.</b>	First Name	<b>Supriya</b>	Last Name	<b>KAR</b>	Photograph
Designation	<b>Associate Professor</b>					
Address	<b>D-7-2, First Floor, Delhi University Flat MAURICE NAGAR, New Delhi 110 007</b>					
Phone No	Office					
	Residence					
	Mobile	<b>+91 99 1191 8174</b>				
Email	<a href="mailto:skkar@physics.du.ac.in">skkar@physics.du.ac.in</a> and <a href="mailto:supriya.k.kar@gmail.com">supriya.k.kar@gmail.com</a>					
Web-Page	<a href="http://fy.chalmers.se/~supriya">http://fy.chalmers.se/~supriya</a>					
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						
<p>(1) Department of Physics &amp; Astrophysics, University of Delhi as a Faculty Member since 2002 (16 years)</p> <p>(2) Indian Institute of Technology, Kanpur as Assistant Professor during 2001-2002 (2 years)</p> <p>(3) Chalmers Univ. of Technology, Goteborg, Sweden as (NFR) Research Associate during 1998-2000 (2 years)</p> <p>(4) University of Tokyo, Komaba, Tokyo, Japan as JSPS Post-Doctoral Fellow during 1996-98 (2 years)</p> <p>(5) Harish-Chandra Research Inst, Allahabad as a Post-Doctoral Research Associate during 1995-96 (1 year)</p>						
Some Administrative Assignments						
<b>1] Deputy Superintendent of Examinations:</b>						
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						
<b>2] Member of Committees:</b>						
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; Library, TPSC (a number of times) during 2003-2012						
<b>3] Academic responsibilities outside Delhi University:</b>						
Refereed manuscript to Journals (EPJ-C, CQG, Pramana), External Examiner of PhD theses (6), Resource person, Confidential work for UPSC and for 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 (torsion dynamics)
- (ii) Cosmological pair production of universe/anti-universe (Big Bang)
- (iii) Quintessence Cosmology and Gravitational Instanton
- (iv) de Sitter tunneling, black hole thermodynamics and accelerated expansion of universe
- (v) 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 )
- (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 )

### 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 Quantum Gravity”**  
Mr. Nitish (Dept. Fellowship) since 2016, in progress
- 10) **Broad subject: “High Energy Physics and Gravitation Theory”**  
Mr. Rohit K. Gupta (Dept. Fellowship) since 2016 Dec, 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: 12**
  - **No. of PG ( IV-semester ) dissertation supervised: 08**
  - **No. of UG dissertation (summer projects/internship) supervised: 18**

#### Publications Profile

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

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

[55] **Kar, Supriya.**

**2018 (Book) Non-commutative Geometry: A Perspective on String and Field Theories. Singapore: World Scientific Publication (in press)- by invitation.**

[54] **Kar, Supriya.**

2017 Editor, Special Issue “Black Holes and Cosmology”  
*Journal of Astrophysics ad Aerospace Technology* (2017)

[53] **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**

[52] **Kar, Supriya, R. Nitish and Deobrat Singh**

**2017, CFT6 Bulk/Boundary AdS<sub>5</sub> Correspondence and Emergent Gravity  
e-Print: arXiv:1612.01065 [hep-th]**

- [51] **Kar, Supriya and R. Nitish**  
**2017, Mass Generation from a Non-perturbative Correction:  
 Massive NS-field and Graviton in (3+1) Dimensions**  
**e-Print: arXiv:1611.04952 [hep-th]**
- [50] *Kar, Supriya*  
 2017, Towards Non-perturbation Theory of Emergent Gravity  
 e-Print: arXiv:1610.07347 [hep-th]
- [49] *Singh Deobrat and Supriya Kar*  
 2017, *D*-instanton and Dark energy  
 Communicated to Journal
- [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  $(DD^-)$ 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 A*29 (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 C*74 (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 D*88 (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<sup>3</sup> 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 A*7:1545-1552.

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) 2018 April 6-8, Int'l Conference "Recent Developments in Cosmology" at BHU, Varanasi  
-Invited speaker
- (2) 2017 Dec. 14-15, Faculty Development Programme at Rajdhani College, University of Delhi  
-Invited to deliver a talk on "Tensors and Geometry"
- (3) 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)



(4) 2016 Nov.06-10, Int'l Conference "New Trends in Quantum Field Theory" at BHU, Varanasi  
**-Invited speaker**

(5) 2015 Aug 23-29, Int'l Conference "SUSY 2015" at Lake Tahoe, California, USA organized by the University of California-Davis **-invited speaker**

(6) 2015 June 21-26, Int'l Conference "STRINGS 2015" at Bengaluru organized by ICTS-TIFR

(7) 2014 Dec.15-20, Indian Strings Meeting (International Conference) at Puri **-Chaired** a technical session

(8) 2014 Nov. 1-5, Int'l Conference "New Trends in Quantum Field Theory" at BHU, Varanasi  
**-Invited speaker**

(9) 2013 Dec.22-27, National Strings Conference at IIT, Kharagpur **-Chaired** a technical session

#### Research Projects (Major Grants/Research Collaboration)

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

(2) **DST Research Project 2010-2013**

#### Awards and Distinctions

(1) JSPS Post Doctoral Fellow 1996-1998, Tokyo, Japan

(2) NFR (Post Doctoral) Fellow 1998-2000, Gothenburg, Sweden

(3) Invited to author a book "Non-commutative Geometry" by World Scientific, Singapore

(4) Member, Editorial Board; ISRN (Int'l Scholarly Research Network) Geometry Journal since 2010

(5) Member, Editorial Board; Journal of Astrophysics & Aerospace Tech, Los Angeles, USA, since 2011

(6) Member, Editorial Board; HEP-The Scientific World Journal, Hindawi Publication, 2013-2017 May

(7) Member, Technical Program, Int'l Conference 2015 Jan 29-31 on "Geometry, Topology & Applications" at Shanghai, China

(8) Member, Technical Program, Int'l 2<sup>nd</sup> Conference 2016 Jan 14-16 on "Geometry, Topology & Applications" at Bangkok, Thailand

#### 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