

## Curriculum Vitae: Dr. Abhijit Majumdar



### **Permanent address:**

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### **Present address:**

Dr. Abhijit Majumdar  
Assistant Professor, Dept. of Physics  
IEST (former BESU), Shibpur  
Howrah-3, West Bengal, India  
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### **Academic Qualifications:**

Assistant Professor, IEST (BESU), Shibpur, Howrah, India:	April, 2014 onward
Visiting Scientist, Institute for Plasma Research, Gujarat, India:	May, 13 - March, 14
Assistant Professor, Gujarat Forensic Science Univ., Gujarat, India:	2013 (Jan-Apr)
Research Scientist at University of Greifswald, Germany:	2009-2012
Postdoc/Wissenschaft Mitarbeiter at University of Greifswald, Germany:	2006-2008
Ph.D in Physics, Univ of Greifswald/Max-Planck, Germany:	2002-2006
M.Tech. in Instrumentation, DAV Univ., Indore, India:	2002
M.Sc in Physics, 3 <sup>rd</sup> rank in DAV Univ., Indore, India:	2001
B.Sc in Physics, Burdwan Univ., W.B., India:	1999

### **Honors/Awards/Educational Experience:**

President of the Governing Body, Netaji Nagar Day College, Kolkata, W.B.	Aug, 2016
Member of "BARC experts" meeting committee, IEST, Shibpur, W.B.	May, 2016
Co-Convener, Plasma Scholar Colloquium, Jadavpur University, W.B.	August, 2015
Convener, BRFST workshop cum theme meeting, IEST, Shibpur, W.B. (BRFST - Board of Research Fusion Science & Technology)	June, 2015
Member of Materials Research Society of India (MRSI)	Sept. 2015
Member of 3 <sup>rd</sup> P. G. Expert Committee in Electronic Science, (Dinabandhu Andrews College, Calcutta University)	April, 2015
Member of European Plasma Society, Balticnet, Germany	2010
Member of Plasma Society of India	2009
Referee of APL, SCT, JAP, ASS, RSI, SSL, ECS, Polymer-journals	2007
Fellow of International Max-Planck Research School, Germany,	2006
Poster awarded in DPG conference in Kiel, Germany,	2004
Member of German Physical Society (Deutsche Physikalische Gesellschaft),	2003
Member of International Max-Planck Research School on Bounded Plasmas,	2002
Recipient of Scholarship, Max-Planck Research School, Germany,	2002

### **Course Introduce at IEST (BESU):**

1. PG (4<sup>th</sup> Sem, Elective): **Plasma Physics** (100 Marks)
2. Ph.D Course: **Advanced Plasma Physics** (50 Marks)

### **Student Guidance:**

1. Guided one bachelor Project student (Completed) at Germany, 2011.
2. **Ph.D Guidance (Total: Six): Two students (Solo Guide), Four (Main Supervisor)**

### **Research Interest:**

- Plasma surface interaction by Magnetron plasma, • Metal/Non-metal nitride synthesis and characterization (Cu<sub>3</sub>N, CuTiN, CN), • Nano-Cluster deposition (magnetic and non-magnetic clusters), • Plasma Bio-Medical Application

### **Expertise on:**

- X-ray Photoelectron spectroscopy •Mass spectrometry •Plasma processing unit

### **Projects handle:**

- Application of atmospheric pressure plasma jet on Bacteria (E.coli), 2006-2010, Funded by: SFB 24, Germany, Role: Co- investigator.
- Metal nitride for photovoltaic film (CuTiCN, Cu<sub>3</sub>N, MgN, NiN etc). 2011 onwards. Funded by University Grant, Greifswald, Germany, Role: Co-Investigator.
- Non-Thermal Plasma application on blood coagulation and skin diseases treatment. Approved by Board of Research on Fusion Science and Technology (BRFST), September, 2014, Role: **Principal Investigator. (Approved, Budget: Rs 21 Lacs)**

### **Publications:**

#### **Published in Refereed Journal:**

1. *Chemical reaction studies in CH<sub>4</sub>/Ar and CH<sub>4</sub>/N<sub>2</sub> gas mixture of a dielectric barrier Discharge*  
**Abhijit Majumdar, K. Matyash, J. F. Behnke, R. Scneider, R. Hippler,**

- J. Phys. Chem. A* **109** 9371 (2005)
2. *Chemical compositions and bond structure of carbon- nitride film deposited by CH<sub>4</sub>/N<sub>2</sub> barrier discharge,*  
**Abhijit Majumdar**, J. Schäfer, P. Mishra, D. Ghose, J. Meichsner, R. Hippler,  
*Surf. Coat. Technol.* **201**, 6437 (2007).
  3. *Development of DBD plasma processing apparatus for mass spectrometry and thin film deposition*  
**Abhijit Majumdar**, Rainer Hippler,  
*Rev. Sci. Instrument* **78**, 075103 (2007)
  4. *Cytocompatibility of amorphous hydrogenated-carbon nitride (aH-CN<sub>x</sub>) films deposited by CH<sub>4</sub>/N<sub>2</sub> dielectric barrier discharge plasmas with respect to cell lines*  
**Abhijit Majumdar**, Karsten Schröder, Rainer Hippler,  
*J. Appl. Phys.* **104**, 1 (2008)
  5. *Microstructural and Chemical evolution of -CH<sub>3</sub> incorporated (low k) SiCO(H) films prepared by dielectric barrier discharge plasma*  
**Abhijit Majumdar**, Gobind Das, N. Patel, P. Mishra, D. Ghose, R. Hippler,  
*Journal of the Electrochemical Society* **155** (1) D22-D26 (2008).
  6. *Development of metal nanocluster ion source based on dc magnetron plasma sputtering at room temperature*  
**Abhijit Majumdar**, S. R. Bhattacharyya, Rainer Hippler,  
*Rev. Sci. Instrument* **80**, 095103 (2009)
  7. *Surface morphology and composition of films grown by size-selected Cu-nanoclusters*  
**Abhijit Majumdar**, M. Ganeva, S.R. Bhattacharayya, D. Ghose, R. Hippler,  
*Vacuum* **83**, 719 (2009).
  8. *Surface morphology and composition of films grown by size-selected Cu-nanoclusters*  
**Abhijit Majumdar**, M. Ganeva, S.R. Bhattacharayya, D. Ghose, R. Hippler,  
*Vacuum* **83**, 719 (2009).
  9. *Viability of E.coli under atmospheric pressure dielectric barrier discharge plasma: CH<sub>4</sub>/N<sub>2</sub>/Ar/O<sub>2</sub> gas composition*  
**Abhijit Majumdar**, Rajesh Kumar Singh, Rainer Hippler,  
*J. Appl. Phys.* **106**, 084701 (2009)
  10. *Rapid thermal annealing effect on amorphous hydrocarbon film deposited by CH<sub>4</sub>/Ar dielectric barrier discharge plasma on Si wafer: Surface Morphology and Chemical evaluation*  
**Abhijit Majumdar**, S.R. Bhattacharayya, Rainer Hippler,  
*J. Appl. Phys.* **105**, 094909 (2009)
  11. *Structural characterization of amorphous hydrogenated-carbon nitride (aH-CN<sub>x</sub>) film deposited by CH<sub>4</sub>/N<sub>2</sub> dielectric barrier discharge plasma: 13C, 1H*

- Solid State NMR, FTIR and Elemental analysis*  
**Abhijit Majumdar**, Gudrun Scholz, Rainer Hippler,  
*Surf. Coat. Technol.* **203**, 2013 (2009)
12. *Role of nitrogen in the formation of amorphous carbon nitride film: x-ray photoemission study*  
**Abhijit Majumdar**, Gobind Das, J. Heinecke and Rainer Hippler,  
*J. Phys. Chem B* **113**, 15734 (2009)
13. *Dependency of temperature on polarization in CH<sub>4</sub>/N<sub>2</sub> DBD plasma: A crude assumption*  
**Abhijit Majumdar**, Basudev Ghosh, Rainer Hippler,  
*Physics of Plasmas* **17**, 113506 (2010)
14. *Chemical reaction studies in C<sub>2</sub>H<sub>2</sub>/Ar, C<sub>2</sub>H<sub>4</sub>/Ar and C<sub>2</sub>H<sub>6</sub>/Ar and N<sub>2</sub> gas mixture of a dielectric barrier discharge*  
H. C. Thejaswani, **Abhijit Majumdar**, Rainer Hippler,  
*Advances in Space Research* **48**, 857 (2011)
15. *Ellipsometric study of carbon nitride films deposited by DC-magnetron sputtering*  
**Abhijit Majumdar**, R. Bogdanowicz, R. Hippler,  
*Photonics Letters of Poland* **3** (2), 70 (2011)
16. *Development of simple compensation circuit for ferro-electric loop tracer with variable frequency*  
S. C. Das, **Abhijit Majumdar**, N. P Lalla, T Sripathi, R. Hippler,  
*Ferroelectrics Letter Section* **38**, 78 (2011)
17. *Measurement of the thickness distribution and optical constants of non-uniform thin Films*  
M. Ohlidal, I. Ohlidal, P. Klapetek, D. Necas and **A. Majumdar**,  
*Meas. Sci. Technol.* **22**, 085104 (2011)
18. *Ultra Low-k property of hydrogenated carbon nitride film: Chemical evaluation*  
**Abhijit Majumdar**, S. C. Das, R. Hippler,  
*Chemical Physics Letters* **524**, 62 (2012)
19. *Deposition of amorphous hydrogenated carbon nitride films with a dielectric barrier discharge*  
Ulrike Martens, **Abhijit Majumdar**, R. Hippler  
*Plasma Process and Polymer* **9**, 647 (2012)
20. *Cold plasma is well tolerated and does not deteriorate human skin barrier and skin capacitance*  
Georg Daeschlein, **Abhijit Majumdar**, K. D. Weltmann,  
*Journal of German Society of Dermatology* **10**, 509-515 (2012)
21. *Development of fast heating inert gas annealing apparatus operated at atmospheric pressure*  
S. C. Das, **Abhijit Majumdar**, T. Shripathi, R. Hippler  
*Rev. Sci. Instrument* **83**, 046109 (2012)

22. *Chemical synthesis of poly-amides films deposited by N<sub>2</sub>/CH<sub>4</sub> DBD plasma*  
**Abhijit Majumdar**, S C Das, T. Shripathi, R. Hippler,  
*Composite Interface 18, 1-10 (2012)*
23. *Nanopatterning of mica surface under low energy ion beam sputtering*  
A. Metya, D. Ghose, S. A. Mollick, and **Abhijit Majumdar**  
*J. Appl. Physics 111, 074306 (2012)*
24. *Role of N<sub>2</sub> in evaluation of sp<sup>2</sup>/sp<sup>3</sup> & optical band gap :Raman spectroscopy*  
**Abhijit Majumdar**, S C Das, R. Hippler,  
*Vibrational Spectroscopy 66 63-68 (2013)*
25. *Role of nitrogen in optical and electrical band gap carbon nitride*  
**Abhijit Majumdar**, S. Mukherjee, R. Hippler,  
*Thin solid film 527, 151(2013)*
26. Structural difference in hydrogenated carbon nitride ...: Shake up satellites and fluorescence phenomena  
**Abhijit Majumdar**, S. C. Das, J. Heinecke, R. Hippler  
*Surface Science 609, 53 (2013)*
27. Development of fast heating electron beam annealing setup for ultra high vacuum chamber  
Sadhan C. Das, **Abhijit Majumdar**, Sumant Katiyal, T. Shripathi, R. Hippler  
*Rev. Sci. Instrument 85, 025107 (2014)*
28. “Electronic bond structure of carbon nitride thin film deposited by HiPIMS and dc magnetron plasma”-  
**Abhijit Majumdar**, Sadhan Chandra Das, Vitaslav Stranak, Rainer Hippler  
*Journal of Coating Science and Technology (JCSR) 2, 28-37 (2015)*
29. “Simultaneous determination of dispersion model parameters and local thickness of thin films by imaging spectro-photometry”  
David Necas, J. Vodak, I. Ohlídal, M. Ohlídal, **Abhijit Majumdar**, L. Zajíčková  
*Applied Surface Science, 350, 149-155, (2015)*
30. Development of power supply for atmospheric pressure plasma jet at room temperature for bio-medical applications,  
Sadhan Chandra Das, Abhijit Majumdar, Subroto Mukherjee, Sumant Katiyal, T. Shripathi, **IEEE Xplore** 978-9 (2016) 3805-4421

## **Patent:**

Patent filed.: Indian Patent Application No: 3727/MUM/2015

Title: Plasma Jet

Year: 2015

Members: **Abhijit Majumdar**, Akshay Vaid, Adam Sanghriyat, Chirayu Patel, Subroto Mukherjee

## **Book/Monograph written:**

**Title: “Hydrogenated carbon nitride by CH<sub>4</sub>/N<sub>2</sub> DBD plasma and its application”**

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Website: <https://www.lap-publishing.com/>

By (author) : Abhijit Majumdar

Published year: 2012

## **Conference Proceedings:**

1. Abhijit Majumdar, Rainer Hippler, “Chemical and biological evaluation of HCN<sub>x</sub>” (PPOMP, plasma processing and organic materials and polymer, November 25-28, 2011, Kochi, Kerala, India), **p-27**, 2011 (published in “Composite interface”- Taylor and Francis).
2. Abhijit Majumdar, Rainer Hippler, *Cytocompatibility of H-CN<sub>x</sub> films deposited by CH<sub>4</sub>/N<sub>2</sub> DBD plasmas with respect to HEK, PC12 and Cancer cell lines* (ISPC 19, Bochum, Germany, July 26-31), **627**, 2009
3. Abhijit Majumdar, Tung Mao Tung, Rainer Hippler “*Hydrocarbon radicals in C<sub>2</sub>H<sub>6</sub>/C<sub>2</sub>H<sub>4</sub>/C<sub>2</sub>H<sub>2</sub>/Ar plasma: Plasma chemistry*”, German Physical Society (DFG), October, **p-256**, 2008.
4. Abhijit Majumdar and Rainer Hippler “*Chemical composition and bond structure of carbon-nitride film deposited by CH<sub>4</sub>/N<sub>2</sub> barrier discharge*”. **IWM** (International Workshop for Micro-plasma), (Greifswald, Germany, 08-11 may, 2006), **P65**, 2006
5. Abhijit Majumdar, Jürgen F. Behnke, Rainer Hippler, Contributed paper of IXth Int. Symp. on *High pressure, low temperature plasma chemistry* (Hakone IX, Padova, Italy, August 23-27), **4P-01**, 2004.
6. Abhijit Majumdar and Rainer Hippler “*Study of mass spectrum analysis of CH<sub>4</sub>/N<sub>2</sub> gas mixture in dielectric barrier discharge*”. **DPG** conference (German Physical Society). (Kiel, Germany, March 8-11, 2004), P 3.22, **39**, 2004.

## **Invited and Seminar talks:**

1. “X-ray reflectivity of Fe-Ni multilayer thin film”, International Max-Planck Research School on Bounded plasma (IMPRS), 14<sup>th</sup> November 2002.
2. “Study of break down properties of CH<sub>4</sub>/N<sub>2</sub> gas mixture dielectric barrier discharge

- plasma”, International Max-Planck Research School (IMPRS), 4<sup>th</sup> December, 2003.
3. “Study of carbon-nitride film deposited by CH<sub>4</sub>/N<sub>2</sub> gas mixture in barrier discharge plasma”, International Max-Planck Research School on Bounded plasma (IMPRS), 14<sup>th</sup> October, greifswald, Germany, 2004.
  4. “Comparative mass spectrum studies between CH<sub>4</sub>/N<sub>2</sub> and CH<sub>4</sub>/Ar barrier discharge plasma”, Expert Workshop on Micro-plasma, Max-Planck Institute, Greifswald, Germany, 09<sup>th</sup> May, 2006.
  5. “Atmospheric pressure plasma on biology” Institute for Plasma Research, Bhat, Ahmdabad, India, 18th December, 2009.
  6. “Plasma processing and application on human cell” Jadavpur University, Kolkata, India, 15th January, 2010.
  7. “Plasma application on thin film and animal cell”-Balticnet-Plasmanet, at Pune, Lavasa. European Technology Exchange Programme, 2<sup>nd</sup> November, 2010
  8. IIT Kharagpur, India, “*Plasma on Thin Film Deposition and Biology*”, 25th January, 2011.
  9. Helmholtz-Zentrum Berlin for Material and Energy GmbH, former Hahn Meitner Institute, Germany, “*Chemical evaluation of Carbon nitride film: X-ray Photoelectron spectroscopy*”, 11 August, 2011.
  10. “Plasma Surface interaction and surface chemical property of HCN<sub>x</sub> film”, First International conference on Plasma Processing of Organic Materials and Polymers (PPOMP) held at Mahatma Gandhi University, Kottayam, India Nov 25-26, 2011.
  11. Invited talk on “Application of Nano-particle in Forensic Science”- Modasa College, DST sponsored conference on 23<sup>rd</sup> January 2013.
  12. Invited talk on “Plasma application on blood coagulation”-Mahatma Gandhi University, Kottayam, Kerala, PSSI (Plasma Science Society of India) on 8<sup>th</sup> December, 2014.
  13. Invited talk on “**Plasma Physics on Human Biology**” on the occasion of “**Diamond Jubilee Series of Lectures**” in Dinabandhu Andrews College on 12<sup>th</sup> August at 2.00 pm.