

Dr. Kamakshya Prasad Modak

Curriculum Vitae

Village - Sukharia (Shibtala),
P.O. - Somra, District - Hooghly,
West Bengal - 712123, India
☎ 8420146629

✉ kamakshya.modak@gmail.com
Assistant Professor, B.K.C. College, Kolkata



Present Position

Assistant Professor,
Department of Physics,
Brahmananda Keshab Chandra College,
111/2, B. T. Road, Bon-Hooghly,
Kolkata - 700108, West Bengal.
(Affiliated to West Bengal State University)

Personal Information

Date of Birth **9th February, 1988.**

Nationality **Indian.**

Sex **Male.**

Marital Status **Single.**

Alt. Emails **kpmodakiitkgp@gmail.com, kamakshya@ymail.com.**
kamakshya@associates.iucaa.in

Education

2003 **Secondary Education, Somra Durgacharan High School, West Bengal Board of Secondary Education, Kolkata, India.**

Percentage of Marks Obtained – 86.125, First Division

2003–2005 **Higher Secondary Education, Kalna Maharaja's High School, West Bengal Council of Higher Secondary Education, Kolkata, India.**

Percentage of Marks Obtained – 87.30, First Division

2005–2008 **Bachelor of Science (Physics Honours), Hooghly Mohsin College, The University of Burdwan, Burdwan, India.**

Percentage of Marks Obtained – 64.0, First Class

2008–2010 **Master of Science in Physics**, *Indian Institute of Technology*, Kharagpur, India.
CGPA – 8.01, First Class

2010–2011 **Post-M.Sc. Associateship in Physics**, *Saha Institute of Nuclear Physics*, Kolkata, India.
Percentage of Marks Obtained – 71.77, First Class

2016 **Ph.D. in Physics**, *Homi Bhabha National Institute*, Mumbai, Ph.D. thesis work done at *Saha Institute of Nuclear Physics*, Kolkata, India.

Projects

2011–2016 **Ph.D. Project**, *Dark Matter Model Building and Phenomenological Study from Particle Physics Aspect*, Saha Institute of Nuclear Physics, Kolkata, India.

Thesis Title: **Investigating Some Aspects of Dark Matter Indirect Detection Using Different Dark Matter Particle Physics Models.**

Thesis Supervisor: **Prof. Debasish Majumdar.**

2010–2011 **Post M.Sc Project**, *Dark Matter Phenomenology*, Saha Institute of Nuclear Physics, Kolkata, India.

Project Title: **Asymmetric Dark Matter.**

Project Supervisor: **Prof. Debasish Majumdar.**

2009–2010 **Master's Project**, *Radio Astronomy*, IIT Kharagpur, Kharagpur, India.

Project Title: **Simulating The Power Spectrum Of HI Intensity Fluctuations.**

Project Supervisor: **Prof. Somnath Bharadwaj.**

Research Career

Aug., 2010 – **Junior Research Fellow**, *Astro-Particle Physics and Cosmology Division*,
July, 2012 Saha Institute of Nuclear Physics, Kolkata, India.

Aug., 2012 – **Senior Research Fellow**, *Astro-Particle Physics and Cosmology Division*,
Jan., 2016 Saha Institute of Nuclear Physics, Kolkata, India.

Feb., 2016 – **Research Associate**, *Astro-Particle Physics and Cosmology Division*, Saha
July, 2016 Institute of Nuclear Physics, Kolkata, India.

Aug., 2016 – **Post Doctoral Fellow**, The Inter-University Centre for Astronomy and As-
Mar., 2017 trophysics (IUCAA), Pune, India.

Teaching Experience

April, 2017 – **Assistant Professor, Department of Physics, Brahmananda Keshab Chandra**
Present Day College, Kolkata, India.
(Affiliated to West Bengal State University)

Courses taken for Physics Under Graduate Students

- 0 General Properties of Matter (Academic Year 2017-18)
- 0 Fourier Analysis (Academic Year 2017-18)
- 0 Nuclear and Particle Physics (Academic Year 2017-18)
- 0 Electromagnetic Theory (Academic Year 2017-18)
- 0 Computational Physics (Academic Year 2017-18)

Supervision of UG Students on short-term projects

Two (Mr. Bikram Biswas & Mr. Suvankar Das)

Area of Specialization and Expertise

- 0 Model building for dark matter from theoretical particle physics aspect
- 0 Study of dark matter phenomenology
- 0 Prospects of both indirect and direct detections for various dark matter models
- 0 Astrophysical signatures (galactic and extragalactic) of dark matter

Research Interests

- 0 Dark Matter model building from Particle Physics aspect (beyond Standard Model)
- 0 Computational Physics
- 0 Neutrino Physics
- 0 Inflation
- 0 Cosmology and Physics of Early Universe
- 0 Neutron Star

List of Publications in International Peer-Reviewed Journals

- 0 *Gamma Ray and Neutrino Flux from Annihilation of Neutralino Dark Matter at Galactic Halo Region in mAMSB Model*
Kamakshya Prasad Modak, Debasish Majumdar;
Journal of Physics G: Nuclear and Particle Physics 40, 075201 (2013) [arXiv:1205.1996 [hep-ph]]
Journal Impact Factor: **5.326**
No. of Citations: **5**
- 0 *Dragging of inertial frames inside the rotating neutron stars*
Chandrachur Chakraborty, **Kamakshya Prasad Modak**, Debades Bandyopadhyay;
The Astrophysical Journal 790, 2 (2014) [arXiv:1402.6108 [astro-ph]]
Journal Impact Factor: **6.28**
No. of Citations: **15**

- *A Possible Explanation of Low Energy γ -ray Excess from Galactic Centre and Fermi Bubble by a Dark Matter Model with Two Real Scalars*
Kamakshya Prasad Modak, Debasish Majumdar, Subhendu Rakshit;
Journal of Cosmology and Astroparticle Physics 1503, 011 (2015) [arXiv:1312.7488 [hep-ph]]
 Journal Impact Factor: **5.877**
 No. of Citations: **80**
- *3.5 keV X-ray Line Signal from Decay of Right-Handed Neutrino due to Transition Magnetic Moment*
Kamakshya Prasad Modak;
Journal of High Energy Physics 1503, 064 (2015) [arXiv:1404.3676 [hep-ph]]
 Journal Impact Factor: **6.22**
 No. of Citations: **54**
- *Deriving super-horizon curvature perturbation from the dynamics of preheating*
 Arindam Mazumdar, **Kamakshya Prasad Modak**;
Journal of Cosmology and Astroparticle Physics 1504, no. 04, 053 (2015) [arXiv:1412.8522 [astro-ph]]
 Journal Impact Factor: **5.877**
 No. of Citations: **3**
- *Confronting Galactic and Extragalactic γ -ray observed by Fermi-LAT with Annihilating Dark Matter in Inert Higgs Doublet Model* †
Kamakshya Prasad Modak, Debasish Majumdar;
The Astrophysical Journal Supplement Series 219, no. 2, 37 (2015) [arXiv:1502.05682 [hep-ph]]
 Journal Impact Factor: **11.215**
 No. of Citations: **34**
 † **selected and submitted to the Prime Minister's Office (PMO) as Important Publication in Theoretical Physics from Saha Institute of Nuclear Physics (SINP)**
- *Constraints on variations in inflaton decay rate from modulated preheating*
 Arindam Mazumdar, **Kamakshya Prasad Modak**;
Journal of Cosmology and Astroparticle Physics 1606, no. 06, 030 (2016) [arXiv:1506.01469 [astro-ph.CO]]
 Journal Impact Factor: **5.634**
 No. of Citations: **6**
- *Constraining Effective Self Interactions of Fermionic Dark Matter*
Kamakshya Prasad Modak;
 in communication [arXiv:1509.00874 [hep-ph]]
 No. of Citations: **3**
- *A Two Component Dark Matter Model with Real Singlet Scalars confronting GeV γ -ray Excess from Galactic Centre and Fermi Bubble*

Debasish Majumdar, **Kamakshya Prasad Modak**, Subhendu Rakshit;

Pramana 86, issue 2, 343 (2016)

Proceedings of UNICOS-2014, International Workshop on Unification and Cosmology after Higgs Discovery and BICEP2

Journal Impact Factor: **0.692**

No. of Citations: **1**

0 *Two Component Feebly Interacting Massive Particle (FIMP) Dark Matter*

Madhurima Pandey, Debasish Majumdar, **Kamakshya Prasad Modak**;

JCAP 06 (2018) 023 [arXiv:1709.05955 [hep-ph]]

No. of Citations: **10**

0 *Neutron Star Cooling via Axion Emission by Nucleon-Nucleon Axion Bremsstrahlung*

Avik Paul, Debasish Majumdar, **Kamakshya Prasad Modak**;

PRAMANA 92 (2019) Vol. 3, No. 44 [arXiv: 1801.07928[hep-ph]]

No. of Citations: **11**

Articles published in International Science News Portal

2014 ***Neutron stars display bizarre gravitational effects.***

published in **Nature India**, doi:10.1038/nindia.2014.130

covered the paper "Dragging of inertial frames inside the rotating neutron stars"

2015 ***New model unveils secrets of dark matter.***

published in **Nature India**, doi:10.1038/nindia.2015.168

covered the paper "Confronting Galactic and Extragalactic γ -ray observed by Fermi-LAT with Annihilating Dark Matter in Inert Higgs Doublet Model"

Achievements & Rewards

2010 **Qualified**, Joint CSIR-UGC NET (National Eligibility Test jointly held by Centre for Scientific & Industrial Research and University Grants Commission), December, 2010, All India Rank 0058/0259 (Lectureship).

2010 **Qualified**, Joint CSIR-UGC NET (National Eligibility Test jointly held by Centre for Scientific & Industrial Research and University Grants Commission), June, 2010, All India Rank 0034/0066 (Lectureship).

2010 **Qualified**, Ph.D. Eligibility Test held by Saha Institute of Nuclear Physics.

2010 **Qualified**, JEST (Joint Entrance Screening Test jointly held by all of the Research Institutes in India), Percentile 97.72, All India Rank 69.

2010 **Qualified**, IIT-GATE (Graduate Aptitude Test in Engineering held by Indian Institute of Technology), Score 351, Rank 713.

2008 **Qualified**, JEST (Joint Entrance Screening Test jointly held by all of the Research Institutes in India), All India Rank 167.

2008 **Qualified**, JAM (Joint Entrance to M.Sc. held by IIT), All India Rank 116.

- 2006 **Qualified in Medical**, *West Bengal Joint Entrance Examinations*, West Bengal, India, Rank 926.
- 2005 **Qualified in Medical & Engineering**, *West Bengal Joint Entrance Examinations*, West Bengal, India, Rank 1024 (Medical), 1589 (Engineering).

Notable Awards Received

- 2016 **Best Ph.D. Thesis Award in Theoretical Physics**, *Saha Institute of Nuclear Physics*, Kolkata, India.
- 2008 **Brojendranath Ghosh Physics Award**, Hooghly Mohsin College for excellent academic performance in B.Sc.(Hons.).
- 2003 **Merit Certificate Under National Scholarship Scheme**, *Education Department*, Govt. Of West Bengal.

Conferences/Workshops/Seminars/Schools

- 2015 **Workshop on High Energy Physics Phenomenology (WHEPP-2015)**, IIT Kanpur, 4-13 December, 2015.
- 2015 **Advancement of Astroparticle Physics & Cosmology (AAPCOS-2015)**, SINP, Kolkata, 12-17 October, 2015.
- 2015 **Light from Dark Side of the Universe**, BHU, Varanasi, India, 17-20 March, 2015.
- 2015 **Three Week Workshop on LHC and Dark Matter (LHCDM 2015)**, IACS, Kolkata, India, 16-20 February, 2015.
- 2014 **SANGAM @ HRI**, HRI, Allahabad, India, 24-29 March, 2014.
- 2013 **Topical Conference on Gravity and Cosmology**, SINP, Kolkata, India, 13th December.
- 2013 **Advancement of Astroparticle Physics & Cosmology (AAPCOS-2013)**, IIAS, Shimla, India, 14-17 June, 2013.
- 2013 **SANGAM @ HRI**, HRI, Allahabad, India, 25-30 March, 2013.
- 2013 **National Conference on Contemporary Issues in High Energy Physics and Cosmology (NC-HEPC 2013)**, Gauhati University, Guwahati, India, 12-14 February, 2013.
- 2013 **XX DAE-BRNS High Energy Physics Symposium (2013)**, Visva-Bharati University, Shantiniketan, India, 13-18 January, 2013.
- 2012 **Neutron stars: Inside & Outside**, SINP, Kolkata, India, 18-19 October, 2012.
- 2012 **XXVII SERC Main School on Theoretical High Energy Physics**, SINP, Kolkata, India, 3-22 September, 2012.

Computational Skills

- 0 Operating systems: **Linux, Windows**
- 0 Languages known: **C, C++, Fortran, Python**
- 0 Dark Matter Phenomenology code: **MicrOMEGAs, DarkSUSY, MadDM, SuperIso Relic**
- 0 Rotating Neutron Stars code: **RNS, LORENE**
- 0 Lattice simulation code for scalar fields in expanding universe code: **LATTICEEASY, HLattice**
- 0 Cosmic Ray Propagation Code: **DRAGON, GALPROP**
- 0 Monte-Carlo Simulation Package: **MadGraph, CalcHEP, PYTHIA**
- 0 Writing New Particle Physics Models: **FeynRules, LanHEP, CompHEP**
- 0 Higgs-related Simulation Package: **HDECAY**
- 0 Supersymmetry code: **SPheno, SARAH, SoftSUSY, SuSEFLAV**
- 0 Big Bang Nucleosynthesis code: **AlterBBN**
- 0 Symbolic Calculations: **FORM**
- 0 RGEs for general gauge theories: **PYR@TE**
- 0 Simulation tools for BE Condensate DM halo: **BEC3P**
- 0 Online tools for Dark Matter study: **DM Limit Plotter, DAMNED, AMIDAS, HM-FCalc**
- 0 Dark Matter annihilation spectra generator: **PPPC4DMID**
- 0 Draw Feynman diagrams or physics-related diagrams: **Axodraw, Jaxodraw, Dia**
- 0 Other Software Packages: **LaTeX, Gnuplot, Xfig, Mathematica, Maple, MATLAB, Origin, MS Office, etc.**

References

- 0 **Prof. Debasish Majumdar** (Ph.D. Supervisor)
Professor,
Astroparticle Physics and Cosmology Division,
Saha Institute of Nuclear Physics,
1/AF, Bidhannagar, Kolkata, India.
email: debasish.majumdar@saha.ac.in
- 0 **Prof. Debades Bandyopadhyay**
Senior Professor & Head,
Astroparticle Physics and Cosmology Division,
Saha Institute of Nuclear Physics,
1/AF, Bidhannagar, Kolkata, India.
email: debades.bandyopadhyay@saha.ac.in
- 0 **Prof. Ambar Ghosal**
Professor,
Astroparticle Physics and Cosmology Division,
Saha Institute of Nuclear Physics,
1/AF, Bidhannagar, Kolkata, India.
email: ambar.ghosal@saha.ac.in

0 **Prof. Palash Baran Pal**

Emeritus Professor,
Physics Department,
Calcutta University,
92, APC Road, Kolkata, India.
email: palashbaran.pal@saha.ac.in

Hobbies

Listening Music, Playing Table Tennis, Traveling etc.