

Curriculum Vitae

Name: Ms. Pooja Bhattacharjee

Date of Birth: 16.12.1990

Sex: Female

Citizenship: Indian

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Contact Information

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Current Position:

Senior Research Fellow (Thesis Submitted & Awaiting for degree).

Status of Thesis: Awarded PhD degree on 7th October, 2021, under Ph.D regulations, 2009, by **University of Calcutta** in **PHYSICS (Theoretical)**.

Research Interest:

1) Analysis of the Fermi-Lat gamma-ray data from dwarf (dSphs) and ultra-faint dwarf spheroidal (UFD) dark matter dominated galaxies and to study the obtained dark matter annihilation cross-section constraints on several thermal and non-thermal theoretical dark matter models. (Two papers **published in JCAP**)

[Collaborators: Dr. Pratik Majumdar (SINP¹), Dr. Sayan Biswas (RRI²), Dr. Mousumi Das (IIA³), Dr. Partha sarathi Joarder (BI⁴), Dr. Subinoy Das (IIA³)]

2) Multiwavelength analysis of composite systems (i.e. SNR+PULSAR+PWN) and to study the exact mechanisms of relativistic (both leptonic and hadronic) particle acceleration in SNR and PWN emission. (Two papers **published in MNRAS and peer-reviewed Conference Proceeding**, respectively)

[Collaborators: Dr. Tulun Ergin (TUBITAK UZAY⁵), Dr. Pratik Majumdar (SINP¹), Dr. Lab saha (UCM⁶), Dr. Hidetoshi Sano (NAO⁷), Dr. Shuta Tanaka (AGU⁸), Dr. Ryo Yamazaki (AGU⁸), Dr. Yasuo Fukui (NU⁹)]

3) Investigating the dark matter signature from Low surface brightness galaxies (LSB) through Fermi-Lat and Cherenkon Telescope Array (CTA) sensitivity. (**Published in MNRAS**)

[Collaborators: Dr. Pratik Majumdar (SINP¹), Dr. Subinoy Das (IIA³), Dr. Mousumi Das (IIA³), Dr. Sayan Biswas (RRI²), Dr. Partha sarathi Joarder (BI⁴)]

4) Multiwavelength analysis of dark matter annihilation signature with Fermi-Lat, VLA and GMRT radio data. (**Published in JCAP**)

[Collaborators: Dr. Debajyoti Choudhury (DU¹⁰), Dr. Dilip Kumar Ghosh (IACS¹¹), Dr. Pratik Majumdar (SINP¹), Dr. Kasinath Das (IACS¹¹)]

5) Multiwavelength analysis of dark matter annihilation signature from Clusters of Galaxies (**in process**)

[Collaborators: Dr. Debajyoti Choudhury (DU¹⁰), Dr. Dilip Kumar Ghosh (IACS¹¹), Dr.

Pratik Majumdar (SINP¹), Dr. Kasinath Das (IACS¹¹), Dr. Ruta Kale (NCRA¹²), Dr. Bhaskar Dutta (TAMU¹³)]

1 Saha Institute of Nuclear Physics, HBNI, 1/AF Bidhannagar, Kolkata 700064, India

2 Raman Research Institute, C. V. Raman Avenue, Bengaluru, Karnataka 560080

3 Indian Institute of Astrophysics, Koramangala, Bengaluru, Karnataka 560034

4 Centre for Astroparticle Physics and Space Science, Bose Institute, Block EN, Sector V, Salt Lake, Kolkata 700091, India

5 TUBITAK Space Technologies Research Institute, ODTU Campus, 06800, Ankara, Turkey

6 Universidad de Complutense, E-28040 Madrid, Spain Ergin, Tülün; TUBITAK Space Technologies Research Institute,

7 National Astronomical Observatory of Japan, Mitaka, Tokyo 181-8588, Japan

8 Department of Physics and Mathematics, Aoyama Gakuin University, 5-10-1 Fuchinobe, Sagamihara 252-5258, Japan

9 Department of Physics, Nagoya University, Chikusa-ku, Nagoya, Aichi 464-8601, Japan

10 Department of Physics and Astrophysics, University of Delhi, Delhi 110007, India

11 School of Physical Sciences, Indian Association for the Cultivation of Science, 2A&2B, Raja S.C. Mullick Road, Jadavpur, Kolkata 700032, India

12 Savitribai Phule Pune University Campus, Spicer College Road, opp. Botanical Garden, Ganeshkhind, Pune, Maharashtra 411007

13 400 Bizzell St, College Station, TX 77843, United States

Technical Knowledge:

Data Analysis Skills: Well-conversant in Fermi-LAT and fermipy analysis.

Training in NuStar, Xmm-Newton, CHANDRA, Xspec & AstroSat data analysis.

Experienced in with Operating Systems: Unix, Linux, Windows

Programming Language : FORTRAN 77, Python

Software Packages: Latex, Mathematica, Matlab, GNUPLOT, Tempo2, fv, ds9, CASA

Educational Qualifications:

• **Post-Doctoral : 22nd November, 2021 – Present: Laboratoire d'Annecy de Physique des Particules (LAPP)**

• **Ph.D : 20th February, 2015 - 2021, Degree Awarded.**

Proposed Thesis title: “STUDY OF POTENTIAL SELF-ANNIHILATION SIGNAL FROM DARK MATTER PARTICLES IN SOME PROSPECTIVE ASTROPHYSICAL DARK MATTER SOURCES”

• **Ph.D. Course Work: 2015-2016** , Bose Institute, Department of Physics, India.

Marks Obtained- 78%

• **Master of Science (M.Sc.) (Specialization in Astroparticle Physics) :** 2012-2014,

St. Xavier's College in collaboration with Bose Institute, University of Calcutta, 1st class, **Marks Obtained- 76%**

• **Bachelor of Science (B.Sc.) (Physics Hons.) :** 2009-2012, Scottish Church

College, University of Calcutta, 1st Class in Honours., **Marks Obtained- 68%**

• **Higher Secondary (Science) :** 2009, Belgharia Mahakali Girls' High School,

West Bengal Council of Higher Secondary Education, 1st Division,

Marks Obtained- 82.8%

• **Secondary:** 2007, Belgharia Mahakali Girls' High School, West Bengal Board

Of Secondary Education, 1st Division, **Marks Obtained- 87%**

Project works:

• **Synchrotron Radiation in High Energy Astroparticle Physics** (PhD course work, Bose Institute, India)

- **A Theoretical Study of the Time Dependence of Deceleration Parameter and Gravitational Constant on the Basis of Brans-Dicke Theory of Cosmology (M.Sc. Project)**

Supervisor : Dr. Sudipto Roy, St. Xavier's College

- **Temperature and Electric Field Dependent Conduction in Doped Polypyrrole (Project under Inspire Scholarship)**

Supervisor : Dr. Upendranath Nandi, Scottish Church College

Academic/Collaborative Visits

- Visiting senior research fellow at Department of Astronomy & Astrophysics, Tata Institute of Fundamental Research (TIFR), India (with Dr. Sudip Bhattacharyya & JRF Sudip Chakraborty). Period of visit: 21st April - 1 May, 2018.

Teaching Experience

- Guided students (mostly post graduates and some of 1st year PhD students of Physics) in hands on experiments using detectors used in cosmic ray experiments at the **Winter School on Astroparticle Physics (WAPP 2015, 20 - 29 December, 2015)** at Darjeeling, India jointly organised by Bose Institute & Tata Institute of Fundamental Research (TIFR),

Diploma

- I attended the **“A COSPAR Capacity Building Workshop” on Broadband spectral and timing studies with AstroSat, Chandra and XMM-Newton** held at the IISER, Mohali, Punjab during March 9-20, 2019 and **obtained a diploma certificate on X-ray analysis for AstroSAT, Chandra and XMM-Newton**. In this workshop, I gained much experience and expertise in the analysis of X-ray data that would be relevant to my

present research. This workshop provided me with a chance to supplement my gamma-ray analysis result with the X-ray data obtained by AstroSAT, Chandra and XMM-Newton.

Awards/Scholarships

i) **SERB-National Post Doctoral Fellowship (N-PDF) 2021**, awarded by **Department of Science and Technology (DST)**, Govt. of India.

ii) **DST-INSPIRE Fellowship**, awarded by **Department of Science and Technology (DST)**, Govt. of India for pursuing Ph.D in Physics.

iii) **DST-INSPIRE Scholarship** for obtaining marks within **top 1%** of my **Class XII** examination conducted by the West Bengal Board of Higher Secondary Examination, Kolkata.

iv) **Scholarship** from **West Bengal Board of Higher Secondary Examination**, Kolkata for scoring above 82% marks in my Higher Secondary Examination, 2009.

v) **All-India Graduate Aptitude Test for Engineering (GATE) exam for Physics in 2015**. My All India rank in that examination is 309.

vi) Received **IAU Grants for the Symposium IAUS 331: "SN 1987A, 30 years later"** (full registration, Accomodation and Travel fee were waived) in International Astronomical Union Symposium, IAUS 331, La Reunion Island.

vii) Medal for securing 3rd Highest marks in my B.Sc Physics Hons, 2012 from Scottish Church College, Kolkata, India.

viii) M.Sc. Course fee was waived for holding the 1st position at my Msc 1st semester, 2012 from St. Xaviers' College, Kolkata, India

Conferences/ School/ Seminar/Symposium/Workshop

i) Workshop and Conference, on **Advanced in Astroparticle Physics and Cosmology (AAPCOS) at SINP, on 12th -17th October, 2015**

ii) 10th Winter workshop and school on **Astroparticle physics(WAPP,2015), Bose Institute at mayapuri, Darjeeling during 17th-29th December, 2015**

iii) **34th Meeting of the Astronomical Society of India (ASI) hosted by the University of Kashmir, Srinagar during 10th-13th May, 2016**

iv) IAU symposium 331 namely, **“IAUS 331: SN 1987A, 30 Years Later”, held at Saint-Gilles-les-Bains, La Reunion Island, France, during 20-24 February, 2017.**

v) **35th Meeting of the Astronomical Society of India (ASI), hosted by Birla Institute of Scientific Research at Jaipur during 6 - 10 March, 2017.**

vi) Workshop on **AstroSat Data Analysis** hosted by **the Indian Space Research Organisation (ISRO)** at **Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune** during **November 13-26, 2017.**

vii) Workshop on **Advances in Astroparticle Physics and Cosmology, AAPCOS-2018** hosted by **Saha Institute of Nuclear Physics (SINP)** at **Kolkata** during **March 06-09, 2018.**

viii) **“A COSPAR Capacity Building Workshop” on Broadband spectral and timing studies with AstroSat, Chandra and XMM-Newton** held at Indian Institute of Science Education and Research (IISER), Mohali, India during March 9th-20th, 2019.

ix) **37th Astronomical Society of India (ASI)**, hosted by **Christ (Deemed to be University)**, Bengaluru during **18-22 February, 2019**.

x) Workshop on **Advances in Astroparticle Physics and Cosmology, AAPCOS-2020** hosted by **Saha Institute of Nuclear Physics (SINP)** at Kolkata during **January 6-10, 2020**.

xi) **Kashiwa Dark Matter Symposium 2020 (Virtual)**.

xii) The ISAPP 2020 school **“Gamma rays to shed light on dark matter”** (Virtual).

Oral Presentations:

i) **“Searching for signatures of dark matter annihilation from TriangulumII using FERMI gamma ray data”** at **35 th Meeting of the Astronomical Society of India (ASI)**, hosted by Birla Institute of Scientific Research at Jaipur during 6 - 10 March,2017

ii) **“Investigating the region of 3C397 in High Energy Gamma-rays”** in **IAU symposium 331** namely, **“IAUS 331: SN 1987A, 30 Years Later”**, at Saint-Gilles-les-Bains, La Reunion Island, France.

Poster Presentations :

- i) **“Searching for signatures of dark matter annihilation from low surface brightness galaxies using FERMI gamma ray data” in 34 th Astronomical Society of India (ASI meeting 2016, 10 – 13, May, 2016), Department of Physics, University of Kashmir, Srinagar, India.**
- ii) **“Analysis of 9 years of Fermi -LAT data from Tucana-II: Possible constraints on the Dark Matter models” in 37th Astronomical Society of India (ASI meeting 2019, 18-22, February, 2019), Christ (Deemed to be University), Bengaluru.**
- iii) **“Analysis of Fermi-LAT data from Tucana-II: possible constraints on the Dark Matter models with an intriguing hint of a signal” in AAPCOS-2020 hosted by Saha Institute of Nuclear Physics (SINP) at Kolkata during January 6-10, 2020.**
- iv) **“Investigating the Dark Matter Annihilation Signal from Several Newly Discovered Dwarf Spheroidal Galaxies with Eleven Years of Fermi-LAT Data” in Kashiwa Dark Matter Symposium 2020 during November 16-19, 2020.**
- v) **“Multiwavelength analysis of low surface brightness galaxies to study possible dark matter signature” in the ISAPP 2020 school “Gamma rays to shed light on dark matter” during June 21-30, 2021.**

List of Publications:

Published in peer-reviewed Journals:

- i) **Constraints on dark matter models from the observation of Triangulum-II with the Fermi Large Area Telescope**

Sayan Biswas, **Pooja Bhattacharjee**, Pratik Majumdar, Mousumi Das, Subinoy Das, Partha Sarathi Joarder,

Journal of Cosmology and Astroparticle Physics, Volume 2017, Number 11, November 2017, Page 003 [[arXiv:1705.00426](#)]

(Communicating Author; The analysis is mostly performed by me.)

ii) **Analysis of Fermi-LAT data from Tucana-II: possible constraints on the Dark Matter models with an intriguing hint of a signal**

Pooja Bhattacharjee, Pratik Majumdar, Sayan Biswas, Partha sarathi Joarder,
Journal of Cosmology and Astroparticle Physics, Volume 2019, Number 08, August 2019, Page 028 [[arXiv:1804.07542](#)]

(First and Communicating Author; The analysis is mostly performed by me.)

iii) **Multiwavelength analysis of low surface brightness galaxies to study possible dark matter signature**

Pooja Bhattacharjee, Pratik Majumdar, Mousumi Das, Subinoy Das, Partha Sarathi Joarder, Sayan Biswas,
Monthly Notices of the Royal Astronomical Society, Volume 501, Issue 3, March 2021, Pages 4238–4254 [[arXiv:1911.00369](#)]

(First and Communicating Author; The analysis is mostly performed by me.)

iv) **Probing the star formation origin of gamma rays from 3FHL J1907.0+0713**

Tulun Ergin, Lab Saha, **Pooja Bhattacharjee**, Hidetoshi Sano, Shuta Tanaka, Pratik Majumdar, Ryo Yamazaki, Yasuo Fukui,
Monthly Notices of the Royal Astronomical Society, Volume 501, Issue 3, March 2021, Pages 4226–4237 [[arXiv:2012.07357](#)]

(Performed the Pulsar analysis part)

v) Gamma-ray and synchrotron radiation from dark matter annihilations in ultra-faint dwarf galaxies

Pooja Bhattacharjee, Debajyoti Choudhury, Kasinath Das, Dilip Kumar Ghosh, Pratik Majumdar

Journal of Cosmology and Astroparticle Physics, Volume 2021, Number 06, June 2021, Page 041 [[arXiv:2011.08917](https://arxiv.org/abs/2011.08917)]

(First Author; The gamma-ray analysis is performed by me.)

Conference Proceeding:

i) Investigating the region of 3C 397 in High Energy Gamma rays

Pooja Bhattacharjee, Pratik Majumdar, Tulun Ergin, Lab Saha, Partha sarathi Joarder, *Proceedings of the International Astronomical Union, Volume 12, Issue S331, February 2017, pp. 316-319 [[arXiv:1801.05961](https://arxiv.org/abs/1801.05961)]*

(First and Communicating Author; The analysis is mostly performed by me.)

Professional References

1. Dr. Parthasarathi Joarder,
Associate Professor (Superannuated),
Department of Physics/CAPSS, Bose Institute, Kolkata.
(Ph.D Supervisor of Ms. Pooja Bhattacharjee)
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3) Dr. Mousumi Das,
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