

Ayan Bhattacharjee

🐦 astro_ayan · Postdoctoral Researcher · UNIST · 🌌 Astro-Ayan

RESEARCH INTERESTS

◦ Accretion Physics ◦ X-Ray Binaries ◦ Radio Galaxy Jets

EMPLOYMENT

🏢 Postdoctoral Researcher

DEPARTMENT OF PHYSICS, UNIST

NRF Creative and Challenging (창의·도전) Research Fellow

South Korea

Jun 2022 – Present

🏢 Researcher

CENTER FOR HIGH-ENERGY ASTROPHYSICS, UNIST

South Korea

Jul 2021 – Jun 2022

🏢 Visiting Researcher

DEPARTMENT OF ASTROPHYSICS AND COSMOLOGY, SNBNCBS

India

Aug 2019 – Jul 2020

🏢 Senior Research Fellow

DEPARTMENT OF ASTROPHYSICS AND COSMOLOGY, SNBNCBS

India

Aug 2016 – Jul 2019

🏢 Junior Research Fellow

DEPARTMENT OF ASTROPHYSICS AND COSMOLOGY, SNBNCBS

India

Aug 2014 – Jul 2016

EDUCATION

🎓 Ph.D. in Astrophysics

[🏛️] S. N. BOSE NATIONAL CENTRE FOR BASIC SCIENCES

THESIS: Spectral And Timing Properties Of Black Holes And Neutron Stars In

X-Ray Binaries Using Two-Component Advective Flow Solution

Advisor: Prof. Sandip k. Chakrabarti

India

Aug 2014 – Feb 2021

🎓 M.Sc. in Physical Sciences (1st Class, 1st Position)

[🏛️] S. N. BOSE NATIONAL CENTRE FOR BASIC SCIENCES

PROJECT: Parrondo's Paradox and the Brownian Ratchet

Project Supervisor: Prof. Punyabrata Pradhan

India

Aug 2012 – Jul 2014

🎓 B.Sc. in Physics (1st Class, 2nd Position)

[🏛️] WEST BENGAL STATE UNIVERSITY

India

2009 – 2012

REFEREED PUBLICATIONS

First Authored: 5 [2 MNRAS[†], 2 ApJ[†], 1 ASSP[†]]

Second authored: 3 [1 ApJ[†], 1 RAA, 1 AdSpR]

Contributory author: 2 [1 ApSS, 1 AdSpR]

Corresponding Author: 5

Complete List of Publications: ORCID, Google Scholar, NASA ADS











PROFESSIONAL SERVICES

- 📖 EDITOR: Two-Component Advective Flow (TCAF) XSPEC User Manual, 2024
- 👥 MEMBER: Korea Numerical Astrophysics Group (KNAG), 2023-Present
- 👥 MEMBER: KOREAN ASTRONOMICAL SOCIETY (KAS), 2021-PRESENT
- 👥 MEMBER: CENTER FOR HIGH-ENERGY ASTROPHYSICS (CHEA), UNIST, 2021-2022
- 👥 PEER-REVIEWER: RESEARCH IN ASTRONOMY AND ASTROPHYSICS, 2020-PRESENT
- 👥 RESOURCE PERSONNEL: TWO-COMPONENT ADVECTIVE FLOW (TCAF) XSPEC USER GROUP, 2014-PRESENT




SELECTED PUBLICATIONS

1. **A. Bhattacharjee**, I. Banerjee, A. Banerjee, D. Debnath, S. K. Chakrabarti, "The 2004 outburst of BHC H1743-322: analysis of spectral and timing properties using the TCAF solution", **MNRAS**, **466**, 1372-1381 (2016)
2. **A. Bhattacharjee**, S. K. Chakrabarti, "Monte Carlo Simulations of Thermal Comptonization Process in a Two Component Advective Flow around a Neutron Star.", **MNRAS**, **472**, 1361-1371 (2017)
3. **A. Bhattacharjee**, "Generalized Flows Around Neutron Stars", in Mukhopadhyay B., Sasmal S. (eds) *Exploring the Universe: From Near Space to Extra-Galactic*, **ASSP**, vol 53. Springer, Cham, 93-107 (2018)
4. **A. Bhattacharjee**, S. K. Chakrabarti, "Timing Properties of Shocked Accretion Flows around Neutron Stars in presence of cooling", **ApJ**, **873**, 119 (2019)
5. A. Banerjee, **A. Bhattacharjee**, D. Debnath, S. K. Chakrabarti, "Spectral Analysis of χ Class Data of GRS 1915+105 Using TCAF Solution", **RAA**, 20(12), 208 (2020)
6. A. Banerjee, **A. Bhattacharjee**, D. Chatterjee, D. Debnath, S. K. Chakrabarti, T. Katoch, & H. M. Antia, "Accretion Flow Properties of GRS 1915+105 During Its θ Class Using AstroSat Data", **ApJ**, 916(2), 68 (2021)
7. D. Chatterjee, D. Debnath, A. Jana, J. R. Shang, S. K. Chakrabarti, H. K. Chang, A. Banerjee, **A. Bhattacharjee**, K. Chatterjee, R. Bhowmik, S. K. Nath, "AstroSat observation of non-resonant type-C QPOs in MAXI J1535-571", **ApSS**, 366(8), 82 (2021)
8. S. Chowdhury, S. Sasmal, J. Brundell, S. Chakraborty, **A. Bhattacharjee**, & S. K. Chakrabarti, "Energetic electron precipitation during lightning activities over Indian landmass as observed from WWLLN and NOAA-15 satellite", **AdSR**, 68(10), 4205 (2021)
9. A. Banerjee, **A. Bhattacharjee**, D. Debnath, S. K. Chakrabarti, "Similarities and differences in accretion flow properties between GRS 1915+105 and IGR J17091-3624: A case study", **AdSR**, 69(7), 2930 (2022)
10. **A. Bhattacharjee**, J. Seo, D. Ryu, & H. Kang, "A Simulation Study of Low-Power Relativistic Jets: Flow Dynamics and Radio Morphology of FR-I Jets", **ApJ** (in press), (2024)






GRANTS, FELLOWSHIPS AND ACHIEVEMENTS

-  **Creative and Challenging Research Grant:** "Simulation Study on Low-Powered FR-I Jets from Radio Galaxies", total budget of 210,000,000 KRW (\$169,195), National Research Foundation of Korea, 2022-2025
-  **SERB-ITS Grant:** Presenting findings at FOXT, API, Amsterdam, DST, India, 2019
-  **COSPAR Grant:** An €800 support for 42nd COSPAR Assembly, COSPAR Secretariat, Caltech, USA, 2018
-  **Secured Eligibility for Lectureship/Assistant Professorship:** CSIR-UGC NET, The Council of Scientific & Industrial Research and University Grants Commission, Department of Higher Education, India, 2015-2016
-  **Secured Eligibility for Scientific Officer:** A 99.6 percentile in OCES/DGFS 2014, Bhaba Atomic Research Centre, Department of Atomic Energy, India, 2014
-  **Secured Eligibility for Engineering M.Tech.:** Ranked 172 in nationwide Graduate Aptitude Test in Engineering (GATE), Department of Higher Education, India, 2014
-  **Gold Medal:** 1st position in IPHD Programme (2012-2014), Dean (AP) & Director of SNBNCBS, DST, 2014
-  **PBIR Fellowship:** Scholarship for Post-B.Sc. Integrated-PhD Scholar, SNBNCBS, DST, India, 2012
-  **Gold Medal:** 1st position in B. Sc.(H) Physics, BRSN College, 2012
-  **INSPIRE (Scholarship for Higher Education):** Top 1% in the 10th & 12th standard, DST, India, 2009

COMPUTATIONAL SKILLS

-  **PROGRAMMING LANGUAGES:** Fortran 77 [Advanced], Shell [Advanced], C/C++ [Good]
-  **COMPUTING TOOLS:** Mathematica [Advanced], ROOT [Advanced], Python [Proficient], Matlab [Good]
-  **GRAPHICAL (PLOTING) SOFTWARES:** GNUplot [Advanced], XmGrace [Advanced], SuperMongo [Advanced], IDL [Advanced], ParaView [Good], Grapher [Good], Origin [Basic]

DATA REDUCTION & ANALYSIS SKILLS:

-  **HEASOFT/XSPEC** [Proficient]: Spectral analysis, modelling.
-  **HEASOFT/XRONOS** [Proficient]: Timing analysis, modelling.
-  **RXTE/PCA** [Proficient]: Spectral and Timing Data extraction, analysis.
-  **RXTE/HEXTE** [Proficient]: Spectral and Timing Data extraction, analysis.
-  **AstroSat/LAXPC** [Advanced]: Spectral and Timing Data extraction, analysis.

INVITED AND SOLICITED TALKS

Two Component Advective Flows (TCAF): Fitting Procedure and Results for Stellar and supermassive black holes [🔊] : <i>X-ray Spectral fitting of BHXRBs by TCAF FITS file</i>	ICSP, Kolkata, India Sep 25, 2024
THE 2023 SEPTEMBER KNAG MEETING [🔊] : <i>A Simulation Study of Low-Power Relativistic Jets:</i> Structures and Dynamics of FR-I Jets	KASI, Daejeon, South Korea Sep 15, 2023
THE 68TH GWRN WORKSHOP [🔊] : <i>Numerical Simulations of Accretion-Ejection around Compact Objects:</i> What to include (and what not to)?	APCTP, POSTECH, Pohang, South Korea Mar 15-16, 2023
CHEA SPECIAL SEMINAR [🔊] : <i>Could There Be a Unified Spectral Model for Black Holes and Neutron Stars?</i>	CHEA, UNIST, Ulsan, South Korea Jul 22, 2021

SELECTED TALKS FROM INTERNATIONAL CONFERENCES

THE 45TH COSPAR ASSEMBLY, SESSION E1.2 [🔊] : <i>What is the Origin of Jets in Accreting Neutron Stars?</i> A Unified Accretion-Ejection Mechanism for Compact Objects	BEXCO, Busan, South Korea Jul 13 - 21, 2024
THE 45TH COSPAR ASSEMBLY, SESSION E1.8 [🔊] : <i>A Simulation Study on Relativistic Jets:</i> Impact of the Central kpc Region on Jets across Different Scales	BEXCO, Busan, South Korea Jul 13 - 21, 2024
THE XXXIst IAU GA MEETING, FOCUS MEETING 1 [🔊] : <i>A Simulation Study on the Morphological Dichotomy of FR-I and FR-II Jets</i>	BEXCO, Busan, South Korea Aug 2-11, 2022
THE 43RD COSPAR ASSEMBLY, SESSION E1.5 [🔊] : <i>What is the Origin of QPOs in Accreting Neutron Stars?</i>	Online, Sydney, Australia Jan 28 - Feb 4, 2021
THE 43RD COSPAR ASSEMBLY, SESSION E1.8 [🔊] : <i>Can there be a Unified Spectral Model for Black Holes and Neutron Stars?</i>	Online, Sydney, Australia Jan 28 - Feb 4, 2021
THE FUTURE OF X-RAY TIMING [🔊] : <i>Can a Two-Component paradigm explain the spectral and timing properties of neutron stars?</i>	API, Amsterdam, Netherlands Oct 22 - 25, 2019
EXPUNIV2018: BLACK HOLES & HIGH ENERGY ASTROPHYSICS [🔊] : <i>The Formation of Two Component Advective Flow around Neutron Stars</i>	SNBNCBS, Kolkata, India Nov 14 - 17, 2018
THE 42ND COSPAR ASSEMBLY, SESSION E1.13 [🔊] : <i>Formation of Two-Component Advective Flows around Neutron Stars and the Possibility of Super-Eddington Accretion Rates</i>	Caltech, Pasadena, CA, USA Jul 14 - 22, 2018
THE 42ND COSPAR ASSEMBLY, SESSION E1.10 [🔊] : <i>Formation and Stability of Oscillating Shocks in Inviscid Advective Flows around Neutron Stars in Presence of Cooling using Smoothed Particle Hydrodynamics Simulations</i>	Caltech, Pasadena, CA, USA Jul 14 - 22, 2018
THE 42ND COSPAR ASSEMBLY, SESSION E1.4 [🔊] : <i>The Formation of Two Component Advective Flow around Neutron Stars</i>	Caltech, Pasadena, CA, USA Jul 14 - 22, 2018
THE 15TH MARCEL GROSSMANN MEETINGS, S. AC1 [🔊] : <i>The Formation of Two Component Advective Flows around Neutron Stars</i>	University of Rome, Italy Jul 1 - 7, 2018
INTEGRAL SYMP., S. 4: ACCRETION AND EJECTION: GALACTIC AND EXTRAGALACTIC [🔊] : <i>Is neutron star spectrum also an outcome of TCAF?</i>	INAF, Venice, Italy Oct 15 - 20, 2017
INTEGRAL SYMP., S. 2: OUTBURSTING SOURCES: BHC, NS, AGN/BLAZARS [🔊] : <i>Outburst of BHC H1743-322: Analysis of Spectral and Timing Properties Using TCAF Solution</i>	INAF, Venice, Italy Oct 15 - 20, 2017
WIDE BAND SPECTRAL AND TIMING STUDIES OF COSMIC X-RAY SOURCES [🔊] : <i>Is Neutron Star Spectrum also an Outcome of TCAF?</i>	TIFR Mumbai, India January 10 - 13, 2017

ORGANIZATIONAL SKILLS

- **Workshop Coordinator:** Two Component Advective Flows (TCAF): Fitting Procedure and Results for Stellar and supermassive black holes, ICSP, India, (**2024**)
- **Conference Volunteer:** International Astronomical Union General Assembly Meeting, at BEXCO, South Korea, (**2022**)
- **Conference Volunteer:** EXPUNIV: Black Hole and High Energy Astrophysics, at SNBNCBS, India, (**2018**)
- **Workshop Coordinator:** X-ray Observations and Data Analysis of Compact Objects at 35th Annual Meeting of Astronomical Society of India held at Jaipur, India (**2017**)
- **Conference Coordinator:** Indian Science Congress [Children Wing] held at SNBNCBS, India (**2013**)