Anjan Kar

Curriculum Vitae

Department of Physics
Indian Institute of Technology Kharagpur
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My Webpage
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Research Interests

Gravitational Physics — Regular black holes, Wormholes, Strong field gravity, black hole shadow, gravitational lensing, Gravitational waveform in Extreme mass ratio systems, Self-force formalism, quasinormal mode, stability analysis, gravitational collapse and black hole thermodynamics.

Education

2022–present **Indian Institute of Technology**, Kharagpur, India
Doctoral Student, Gravitational Physics
Advisor: *Prof. Sayan Kar*
Thesis Title:

2020–2022 **Indian Institute of Technology**, Kharagpur, India
M.Sc., Physics, CGPA: 9.12
Advisor: *Prof. Sayan Kar*
Thesis Title: Shadows of rotating and non-rotating black holes

2017–2020 **Vidyasagar University**, Midnapore, India
B.Sc., Physics, CGPA: 8.83

Skills

Programing: Python, Pandas, Mathematica, xAct, xTensor, xCoba

Language: Bengali (native), English (fluent), Hindi (basic), German (basic)

Publications

e-Print 2026 **'Gravitational wave radiation from periodic orbits in regular black holes'**.
Rishav Agrawal, ***Anjan Kar***, Soumya Jana and Sayan Kar, arXiv:2602.20745 [gr-qc]

e-Print 2025 **'A note on the Penrose process in rotating regular black holes'**.
Anjan Kar, Ayan Dey and Sayan Kar, arXiv:2510.11364 [gr-qc]

EPJC 2025 **'Diverse regular spacetimes using a parametrised density profile'**.
Anjan Kar and Sayan Kar European Physical Journal C, vol. 85, no. 773, p. 7, 2025, arXiv:2504.12042 [gr-qc]

PRD 2025 **'New rotating Lorentzian wormhole spacetime'**.
Anjan Kar, Soumya Jana and Sayan Kar, Physical Review D, vol. 111, no. 6, p. 064010, 2025, arXiv:2411.09202 [gr-qc]

EPJC 2024 **'Aspects of a novel nonlinear electrodynamics in flat spacetime and in a gravity-coupled scenario'**.
Anjan Kar, European Physical Journal C, vol. 84, no. 12, p. 1246, 2024, arXiv:2406.10577 [gr-qc]

GRG 2024 **'Novel regular black hole: geometry, source and shadow'**.
Anjan Kar and Sayan Kar, General Relativity and Gravitation, vol. 56, no. 5, p. 52, 2024, arXiv:2308.12155 [gr-qc]

Academic Service

2025–present **Reviewer**, *Physics Letters B* (Elsevier). Reviewed manuscripts on general relativity, black holes, and gravitational physics.

Academic Visit

IACS 2025 A four-day academic visit to the **Indian Association for the Cultivation of Science (IACS)**, Kolkata, from May 19 to May 23, 2025. The visit was hosted by Professor Sumanta Chakraborty.

Seminar and poster presentations

NWG 2026 '**Construction of regular spacetimes from a generic parametrised density profile**' seminar presented at the '*Neighborhood Workshop On Gravity*' organised by The Indian Statistical Institute, Kolkata in February 2025 at Kolkata, India.

GR24 Amaldi16 2025 '**Rotating version of the static R = 0 Lorentzian wormhole: geometry, matter and shadow**' poster presented at the '*24th International Conference on General Relativity and Gravitation (GR24) and the 16th Edoardo Amaldi Conference on Gravitational Waves (Amaldi16)*' organised by The Institute for Gravitational Research at the University of Glasgow and the Institute of Physics in July 2025 at Glasgow, Scotland, UK.

IACS visit 2025 '**New regular solutions using a generic density profile**' seminar presented at the '*Indian Association for the Cultivation of Science (IACS)*', Kolkata, during a visit there.

IAGRG 2025 '**Regular black holes from a nonlinear electrodynamics free from fractional powers of** $F_{\mu\nu}F^{\mu\nu}$' poster presented at '*33rd Indian Association of General Relativity and Gravitation (IAGRG 2025)*' organised by BITS Pilani in January 2025 in Pilani campus, India.

Rs day 2024 '**New regular black holes: geometry, source and shadow**' poster presented at the '***Research Scholar Day***', an event organized by the Department of Physics, Indian Institute of Technology Kharagpur (IIT Kharagpur), India in 2024.

ICGC 2023 '**New regular black holes: geometry, matter source and shadow**' seminar presented at '*10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)*' organised by Indian Institute of Technology Guwahati (IIT Guwahati) in December 2023 in Guwahati, India.

GrAsCo 2023 '**The regular black holes**' seminar presented at '**Gravity Astrophysics and Cosmology Seminar**', a weekly event at Indian Institute of Technology Kharagpur in April 2023.

Schools, conferences and workshops

NWG 2026 'Neighborhood Workshop On Gravity 2026' organised by The Indian Statistical Institute, Kolkata in February 2025 at Kolkata, India.

GR24 Amaldi16 2025 '24th International Conference on General Relativity and Gravitation (GR24) and the 16th Edoardo Amaldi Conference on Gravitational Waves (Amaldi16)' organised by The Institute for Gravitational Research at the University of Glasgow and the Institute of Physics in July 2025 at Glasgow, Scotland, UK.

ICTS School 2025 'Beyond the Horizon: Testing the black hole paradigm (ICTS 2025)' organised by ICTS-TIFR Bengaluru in March-April 2025 in Bengaluru, India.

IAGRG 2025 '33rd Indian Association of General Relativity and Gravitation (IAGRG 2025)' organised by BITS Pilani in January 2025 in Pilani campus, India.

ICGC 2023 '10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)' organised by Indian Institute of Technology Guwahati (IIT Guwahati) in December 2023 in Guwahati, India.

IAGRG school 2023 'Indian Association of General Relativity and Gravitation (IAGRG) School on Gravitation and Cosmology 2023' organised by 'Internation Centre for Theoretical Science (ICTS Bengaluru)' in October 2023 in Bengaluru, India.

VBO workshop 2023 'IIA Kavalur black hole workshop: Theory and observation 2023' organised by Indian Institute of Astrophysics (IIA Bangaluru) in June 2023 in Kavalur, Tamilnadu, India.

IAGRG school 2022 (online) 'Indian Association of General Relativity and Gravitation (IAGRG) School on Gravitation and Cosmology 2022' organised by International Centre for Theoretical Science (ICTS Bengaluru, India) in April 2022.

Teaching Experience

2023–present **Teaching Assistant**, Indian Institute of Technology Kharagpur. Assisted in undergraduate and postgraduate courses in Physics, including tutorials, grading, and mentoring students.

Referees

Prof. Sayan Kar
PhD Supervisor
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Indian Institute of Technology Kharagpur, India
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Dr. Soumya Jana
Collaborator
Department of Physics
Vidyasagar University, India
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Dr. Mostafizur Rahman
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Department of Physics
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