



Sultana N. Nahar: PUBLICATIONS

vi) Publications in scientific research

(Complete references: <https://www.astronomy.ohio-state.edu/nahar.1/publications.html>)

1. SCIENTIFIC PUBLICATIONS:

1. Textbook: "Atomic Astrophysics and Spectroscopy": 1,
2. Book editor: "Photoionization of Atoms" 1,
3. e-Magazine editor: "An-Nisa" for women in STEM: 3 Vol,
4. Newsletter editor: "International Society of Muslim Women in Science": 14
5. Publications in Scientific Research:~ 207

i) Research Book Chapters : 6

ii) Refereed Journals: ~ 151,

iii) Invited refereed reviews - 20,

iv) Conference proceedings - 20,

v) Invited articles - 5

vi) Technical reports - 5

- In Progress: 5 in preparation

• Dedication articles for scientists: 5

• Featured in Articles in Science: 35

• Papers highlighted on the journal cover page: 2

4. PUBLICATIONS IN STEM RESEARCH AND EDUCATION: 51 (total)

i) Book Chapters - 1

ii) Long reports (US Department of State Long Report, ISMWS): 2

iii) News articles in APS newsletters (Main, FIP,CSWP), An-Nisa: 39

vii) Outreach and Engagement Publications at OSU Knowledge Bank: 10

• Featured in Articles for STEM Education and Research: 16

NOTE: Monthly Highlighted paper:

1. "Database NORAD-Atomic-Data ...", S. N. Nahar, Atoms 8, issue 4, 68 (2020)

Editor's Choice Articles:

1. "The Opacity Project: R-Matrix Calculations for Opacities of High-Energy-Density ..." (invited), A.K. Pradhan and S.N. Nahar, Atoms 13, 85 (2025)

2. "Theoretical Spectra of Lanthanides for Kilonovae ..", S.N. Nahar, Atoms 12, 24 (2024)

3. "Enhancement of Database NORAD-Atomic-Data ...", S.N. Nahar and G. Hinojosa-Aguirre, Atoms 12(4), 22 (2024)

BIBLIOGRAPHY OF SCIENTIFIC PUBLICATIONS

1) TEXTBOOK:

1. *Atomic Astrophysics and Spectroscopy*, Anil K. Pradhan and Sultana N. Nahar (Cambridge University Press, 2011)

2) EDITOR OF BOOKS: 1

1. **"Photoionization of Atoms"**, A special issue book of journal Atoms (Editors: Sultana N Nahar and Guillermo Hinojosa, Publisher: MDPI, Basel, Switzerland 2024) (<https://www.mdpi.com/books/reprint/10231-photoionization-of-atoms>)

3) BOOK CHAPTERS: 6

1. Chapter 9 (p.123 - 132): "AHMED ZEWAIL - OUR PRIDE", Sultana N. Nahar, in "The Brilliant Zewail" (Editor: Lotfia El-Nadi, World Scientific publication 2019)
2. Chapter 15: "Astronomy and Cancer Research: X-Rays and Nanotechnology From Black Holes to Cancer Therapy", A.K. Pradhan and S.N. Nahar, Proceedings of 3rd International Conference on Current Development in Atomic, Molecular, Optical and Nano Physics, University of Delhi, Delhi, India, December 14-16, 2011 in *New Trends in Atomic & Molecular Physics Advanced Technological Applications*, Springer Series on Atomic, Optical, and Plasma Physics 76 (Editor Man Mohan, Springer-Verlag, Berlin Heidelberg, 2013, DOI 10.1007/978-3-642-38167-6_1), p. 253-265
3. Chapter 7: "The Iron Project: Photoionization and Photoexcitation of Fe XVII in Solar Opacity", S.N. Nahar, Proceedings of the 3rd International Conference on Current Development in Atomic, Molecular, Optical and Nano Physics, University of Delhi, India, December 14-16, 2011 *New Trends in Atomic & Molecular Physics - Advanced Technological Applications*, Springer Series on Atomic, Optical, and Plasma Physics 76 (Ed. Man Mohan, Springer-Verlag, Berlin Heidelberg, 2013, DOI 10.1007/978-3-642-38167-6_1), p. 115-132
4. Chapter 9: "Resonant theranostics: A New Nano-Biotechnological Method for Cancer Treatment Using X-ray Spectroscopy of Nanoparticles", S.N. Nahar, A.K. Pradhan, M. Montenegro, in *Simulations in Nanobiotechnology*, CRC Press - Taylor & Francis Group (Ed. Kilho Eom, 2011), p.305-330
5. Chapter 3: "Solar Irradiance of the Earth's Atmosphere", S.N. Nahar, in *Climate Change and Food Security in South Asia* (UN sponsored, Eds. R. Lal, M.V.K. Sivakumar, S.M.A. Faiz, A.H.M.M. Rahman, K.R. Islam, Springer, 2011), p. 31-42
6. Chapter: "Mohabishshal (The Universe)" (in Bengali), S.N. Nahar, in *Ekushe Shotoker Jatisbiggan (Astronomy of 21st Century)*, celebrating the International Year of Astronomy 2009 in Bangladesh (eds. A.M. Harun-ar-Rashid, M. Hasan, Tramrolipi, Bangladesh, 2010), p.58-70 (No 39 in <http://www.science.gov/topicpages/s/star+study+nct00237913.html>)

4) REFEREED SCIENTIFIC JOURNALS:~ 150

1. IN PREPARATION:

1. "Electron-Iron recombination of Ar XVI - Ar XVIII", Sultana N. Nahar
2. "Collision strengths for P II", Sultana N. Nahar
3. "Spectral feature of Ti I and Ti III with a diagnostic line of Ti I", Sultana N. Nahar and Faysal Mehedi

SUBMITTED:

"Characteristic spectral features in photoionization of the ground and excited levels of Ca III", Sultanan N. Nahar (submitted, 2026)

2. "The R-matrix Method: Future Applications for Laboratory and Astrophysical Plasma Sources" A.K. Pradhan¹, S.N. Nahar¹, Man Mohan², Alok K. S. Jha³, Z. Samak⁴, R. Naghma⁵, N. Singh¹⁰, A. Goyal¹¹, F. Yadav², Narendra Kumar³, M. Dimri⁶, D. Dawra⁷, D. Chari⁸, A. Ward⁸, R. Sipes¹, V. Bhandari⁹, M. Xu¹ (submitted 2026, Preprints publication DOI: <https://doi.org/10.20944/preprints202608.1198.v1>)

IN PRESS:

3. "Emissivity line ratios for [Mn III] and spectral diagnostics of H II regions", Zher Samak, Sultana N. Nahar, Anil K. Pradhan, MNRAS Lett. (in press, 2026)

PUBLISHED:

PHOTOIONIZATION, ELECTRON-ION RECOMBINATION, OPACITY, ASTROPHYSICS:

4. "R-Matrix calculations for opacities: V. Temperature-density dependence of photoabsorption cross sections and opacity spectra of oxygen ions O vi and O vii", D Chari , S N Nahar, A K Pradhan, J. Phys. B At. Mol. Opt. Phys. 59 145003 (2026, <https://doi.org/10.1088/1361-6455/ae8c98>)
5. "AI FOR ASTROPHYSICAL SPECTROSCOPY", S.N. Nahar, Phys. Sci. Forum 2016, 1-13, 12 (refereed journal for Proceeding Papers, <https://doi.org/10.3390/psf2026013012>, Presented at the 1st International Online Conference on Atoms, 29-30 January 2026; <https://sciforum.net/event/IOCAT2026>.)
6. "[O III] line ratios and evolution of oxygen abundance with redshift using JWST-VLT-Keck observations", V. Bhandari, M, Xu, S.N. Nahar, A.K. Pradhan, MNRAS 549, 1-14 (2026, <https://doi.org/10.1093/mnras/stag955>, Advance Access publication 2026 May 23)
7. "The Opacity Project: R-Matrix Calculations for Opacities of High-Energy-Density Astrophysical and Laboratory Plasmas" (invited), Anil K. Pradhan and Sultana N. Nahar, Atoms 13, 85 (Atoms Special issue "Electronic, Photonic and Ionic Interactions with Atoms and Molecules", 2025)
- *Highlighted on the cover paper of Oct issue of journal Atoms.*
8. "Spectral features of photoionization of ground and excited levels of P I", Sultana N Nahar, Can.J.Phys. 00:, p1-10 (2025, [dx.doi.org/10.1139/cjp-2025-0162](https://doi.org/10.1139/cjp-2025-0162))
9. "Energy levels and characteristic features in photoionization of Cl III using the R-matrix method", S.N. Nahar, Can. J. Phys. 103: 89-99 (2025, [dx.doi.org/10.1139/cjp-2023-0320](https://doi.org/10.1139/cjp-2023-0320), online 2024, <https://cdnsiencepub.com/doi/10.1139/cjp-2023-0320>)
- Invited article in issue "Bound States and Quantum Correlations" in honor of Prof. A. Ravi P. Rau: Part I", Vol 103, Number 1, January 2025

10. "Spectra of phosphorus ions for astrophysical modeling: P I - P XV", Sultana N Nahar and Bilal Shafique, *Can. J. Phys.* 103: 100-130 (2025, dx.doi.org/10.1139/cjp-2023-0272, <https://cdnsiencepub.com/doi/10.1139/cjp-2023-0272>, online 2024)
- Invited article in issue "Bound States and Quantum Correlations" in honor of A. Ravi P. Rau: Part I", Vol 103, Number 1, January 2025
11. "R-Matrix calculations for opacities: I. Methodology and computations", A.K. Pradhan, S.N. Nahar, W. Eissner, *J. Phys. B: At. Mol. Opt. Phys.* 57 125001 (2024, <https://doi.org/10.1088/1361-6455/ad421c>, astroph arXiv: <https://arxiv.org/pdf/2308.14882.pdf>)
12. "R-Matrix calculations for opacities.II. Photoionization and oscillator strengths of iron ions Fe XVII, Fe XVIII and Fe XIX", S.N. Nahar, L. Zhao, W. Eissner, A.K. Pradhan, *J. Phys. B: At. Mol. Opt. Phys.* 57 125002 (2024, DOI 10.1088/1361-6455/ad4241, astroph arXiv: <https://arxiv.org/pdf/2308.14854.pdf>)
- 3rd paper in the series: "R-matrix calculations for opacities: III. Plasma broadening of autoionizing resonances", A.K. Pradhan, *J. Phys. B: At. Mol. Opt. Phys.* 57 125003 (2024, <https://doi.org/10.1088/1361-6455/ad421d>, astroph arXiv: <https://arxiv.org/pdf/2308.14870.pdf>)
13. "R-Matrix calculations for opacities: IV. Convergence, completeness, and comparison of relativistic R-matrix and distorted wave calculations for Fe XVII and Fe XVIII", L. Zhao, S.N. Nahar, A.K. Pradhan, *J. Phys. B: At. Mol. Opt. Phys.* 57 125004 (2024, DOI 10.1088/1361-6455/ad45f, astroph arXiv: <https://arxiv.org/pdf/2308.14880.pdf>)
14. "Theoretical Spectra of Lanthanides for Kilonovae Events: Ho I-III, Er I-IV, Tm I-V, Yb I-VI, Lu I-VII", Sultana N. Nahar, *Atoms* 12, 24 (2024, <https://doi.org/10.3390/atoms12040024>)
Preprints 2023, 2023111481.<https://doi.org/10.20944/preprints202311.1481.v1>
(<https://www.preprints.org/manuscript/202311.1481/v1>)
15. "Enhancement of Database NORAD-Atomic-Data for Atomic Processes in Plasma" (invited), Sultana N. Nahar and Guillermo Hinojosa-Aguirre, *Atoms* 12(4), 22 (2024, <https://doi.org/10.3390/atoms12040022>)
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16. "Biosignature Line Ratios of [P II] in Exoplanetary and Nebular Environments", Kevin Hoy, Sultana N. Nahar, Anil K. Pradhan, *MNRAS Lett* 521, L48-L52 (2023, arXiv:2301.07736v1 [astro-ph.EP] 18 Jan 2023)
17. "Theoretical and experimental study of photoionization of Cl III", S.N. Nahar, Edgar M. Hernández, D. Kilkoyné, A. Antillón, A. M. Covington, O. González-Magaña, L. Hernández, V. Davis, D. Calabrese, A. Morales-Mori, D. Hanstorp, A. M. Juárez, Guillermo Hinojosa, *ATOMS* 11, 28 (2023, <https://doi.org/10.3390/atoms11020028>) (13 pages)
18. "Photoionization and electron-ion recombination of Ca XV for coronal plasma", S. N. Nahar, *New Astronomy* 98, 101925 (2023, online 2022)

19. "Verification of atomic data for solar oxygen abundance models", S.N. Nahar, MNRAS Lett 512, Issue 1, L39-L43 (2022, doi: <https://doi.org/10.1093/mnrasl/slac0152>)
20. "Photoionization and Electron-Ion Recombination of $n = 1$ to Very High n -Values of Hydrogenic Ions", Sultana N. Nahar, Atoms 9, 73 (2021) (doi: <https://doi.org/10.3390/atoms9040073>)
21. "Database NORAD-Atomic-Data for atomic processes in plasma", Sultana N. Nahar, Atoms 8, issue 4, 68 (2020), DOI 10.3390/atoms8040068
- The article was one of two front-page highlights of ATOMS for months
22. "Photoionization features of the ground and excited levels of Cl II and benchmarking with experiment", S.N. Nahar, New Ast 82, 101447 (2021, online July 2020)
23. "Characteristic features in photoionization of Fe XIX", S.N. Nahar, New Ast 73, 101277(1-7) (2019)
24. "Single-photon photoionization of oxygen-like Ne III", S. N. Nahar, A. M. Covington, D. Kilcoyne, V. T. Davis, J. F. Thomson, E. M. Hernández, A. Antillón, A. M. Juárez, A. Morales-Mori, G. Hinojosa, Intl. J. Mass Spectroscopy 443, 61-69 (2019)
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28. "Photoionization of P^+ : Experiment and Theory", S.N. Nahar, E. M. Hernández, L. Hernández, A. Antillón, A. Morales-Mori, O. González, A. M. Covington, KC Chartkunchand, D. Hanstorp, A. M. Juárez, G. Hinojosa, JQSRT 187, 215-223 (2017, online on Oct 5, 2016)
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35. "A higher-than-predicted measurement of iron opacity at solar interior temperatures", J.E. Bailey, T. Nagayama, G.P. Loisel, G.A. Rochau, C. Blancard, J. Colgan, Ph. Cosse, G. Faussurier, C.J. Fontes, F. Gilleron, I. Golovkin, S.B. Hansen, C.A. Iglesias, D.P. Kilcrease, J.J. MacFarlane, R.C. Mancini, S.N. Nahar, C. Orban, J.-C. Pain, A.K. Pradhan, M. Sherrill, B.G. Wilson (22 authors), *Letter, Nature* 517, 56-59 (2015)
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44. "Electron-Ion Recombination and Photoionization of Fe XXI", Sultana N. Nahar, *J. Quant. Spec. Rad. Transfer* 109, 2731-2742 (2008)
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