

Ramandeep Gill

Instituto de Radioastronomía y Astrofísica
Universidad Nacional Autónoma de México
Antigua Carretera a Pátzcuaro # 8701 Ex-Hda.
San José de la Huerta, Morelia, Michoacán
México C.P. 58089

☎ +52-551-470-5083
@ rsgill.rg@gmail.com
💻 www.ramandeepgill.com

Research Interests

- ❖ **GRB jets:** Spectro-polarimetric modeling of radiation, radiation transfer, kinetic simulations, MHD simulations, jet geometry and composition, high-energy processes
- ❖ **EM signatures of compact object mergers:** Merger remnants and their lifetimes, kilonova physics, relativistic jet launching, dynamics, and prompt and afterglow emission
- ❖ **Fast radio bursts:** Physics of FRBs in strong magnetic field plasmas
- ❖ **Neutron stars:** Magnetic field decay, magnetar bursts, population synthesis, neutron star cooling, Pulsar/magnetar wind nebulae
- ❖ **Relativistic plasmas:** Plasma waves, mode coupling to radiation, turbulence, magnetic reconnection, cosmic-rays, MHD simulations

Employment

- | | |
|--|----------------|
| ❖ Institute of Radio Astronomy & Astrophysics
Assistant Professor (Investigador Titular A) | 2021 - Present |
| ❖ The George Washington University
Postdoctoral Fellow | 2019 - 2021 |
| ❖ The Open University of Israel
Postdoctoral Fellow | 2015 - 2021 |
| ❖ Institute for Theoretical Physics, Goethe University
Visiting Research Scholar | 2018 - 2019 |
| ❖ Canadian Institute for Theoretical Astrophysics
Postdoctoral Fellow | 2012 - 2015 |

Education

- | | |
|---|------------|
| ❖ PhD in Astrophysics
University of British Columbia, Vancouver, Canada | Nov., 2012 |
|---|------------|

- ❖ **BSc in Physics and Astronomy (Hons.)** 2007
University of British Columbia, Vancouver, Canada

Grants & Awards

- ❖ **PAPIIT (UNAM) Research Grant (PI), IA105823** 2023
Probing Gamma-Ray Burst Physics with Polarization. \$21k USD. Mexico.
- ❖ **The Open University of Israel Fellowship** 2017 - 2018
- ❖ **100k CPU hrs on SuperMUC supercomputer** 2017
- ❖ **100k CPU hrs on HazelHen supercomputer** 2017
- ❖ **The Open University of Israel Research Scholarship** 2019 - 2017
- ❖ **Outstanding Postdoctoral Researcher Fellowship** 2015
The Open University of Israel, Raanana, Israel
- ❖ **Canadian Institute for Theoretical Astrophysics Fellowship** 2012 - 2015
- ❖ **NSERC Canada Graduate Scholarship** 2009 - 2012
The University of British Columbia, Vancouver, Canada
- ❖ **Four Year Fellowship** 2009 - 2012
The University of British Columbia, Vancouver, Canada
- ❖ **Graduate Research Mobility Award** 2009
The University of British Columbia, Vancouver, Canada
- ❖ **Graduate Entrance Scholarship** 2007
The University of British Columbia, Vancouver, Canada

Teaching and Mentoring

- ❖ **PhD Thesis Supervisor:** Mauricio Gonzalez Servin (IRyA-UNAM) 2024 - Present
Thesis: *General relativistic hydrodynamic simulations of double tidal disruption events.* Morelia, Mexico.
- ❖ **BSc Thesis Supervisor:** Jessica Saldivar (ENES) 2024 - Present
Thesis: *What makes gamma-ray bursts TeV bright?.* Morelia, Mexico
- ❖ **MSc Thesis Supervisor:** Mauricio Gonzalez Servin (IRyA-UNAM) 2023 - 2024
Thesis: *High-energy emission in gamma-ray bursts.* Morelia, Mexico
- ❖ **Postdoctoral Supervisor:** Dr. Asuka Kuwata (IRyA-UNAM) 2025 - Present
Topic: *GRB afterglows and polarization.* Morelia, Mexico
- ❖ **Postdoctoral Supervisor:** Dr. Edilberto Aguilar-Ruiz (IRyA-UNAM) 2024 - Present
Topic: *Very-high energy emission in gamma-ray bursts.* Morelia, Mexico
- ❖ **Postdoctoral Supervisor:** Dr. Gibran Morales (IRyA-UNAM) 2023 - 2025

Topic: *Gamma-ray bursts at different redshifts*. Morelia, Mexico

- ❖ **PhD Thesis Examination Committee:** Leonardo Enrique Garcia Garcia 2024
Institute of Astronomy, UNAM, Mexico City, Mexico
- ❖ **Lecturer:** Graduate course on *Radiative processes in astrophysics* 2022 - 2025
IRyA-UNAM, Morelia, Mexico
- ❖ **Lecturer:** Short course on astrophysical outflows 2023 - 2025
Summer school, IRyA-UNAM, Morelia, Mexico
- ❖ **Lecturer:** Graduate course on *Gamma-ray bursts* 2022
IRyA-UNAM, Morelia, Mexico
- ❖ **Graduate Student Advisory Committee:** Julián Esteban Becerra Bernal 2022 - Present
(MSc, IA-UNAM); Roberto Reyes Cabañas (MSc, IRyA-UNAM);
Alejandro Orozco Sánchez Esteban (MSc, IRyA-UNAM); Rivas Sánchez
Blanca Mariana (PhD, IRyA-UNAM)

Outreach

- ❖ **Outreach Article:** *Gamma-Ray Bursts - The Most Powerful Cosmic Explosions* 2024
BUM - Bulletin of UNAM Campus Morelia
- ❖ **Written Interview:** BUM - Bulletin of UNAM Campus Morelia 2022
- ❖ **Astronomy Night Supervisor:** Supervised telescope operation for the event 2022
Night of the Stars, Tzintzuntzan, Michoacan, Mexico

Academic Services

- ❖ PAPIIT project reviewer 2024 - 2025
- ❖ Reviewer for Fermi Cycle 13 2020
- ❖ Referee for journals: MNRAS, ApJ, A&A, Nature, Science, Galaxies, 2012 - Present
Physical Review B, JCAP

Institutional Engagement

- ❖ **LOC co-chair:** Workshop of GRBs and Central Engine Powered Transients Dec 2024
Playa Del Carmen, Mexico (<https://bigbang.nucleares.unam.mx/grb2024/>)
- ❖ **Weekly Colloquium co-organizer** - IRyA-UNAM, Morelia, Mexico 2023 - Present

-
- ❖ **Monthly International Colloquium co-organizer:** Colloquium series between UNAM and Taiwan 2023 - Present
 - ❖ **Earthquake safety coordinator,** IRyA-UNAM 2023 - Present

Workshops, Conferences, Colloquia:

- ❖ **Invited Talk:** Advancing a Universal Analysis Framework for High-Energy Spectro-Polarimetry, Geneva, Switzerland 2025
Title: *Spectro-Polarimetric Modeling of GRBs and Their Afterglows*
- ❖ **Invited Talk:** ERIDANUS Workshop 2024, Ensenada, Mexico 2024
Title: *GRB Jet Angular Structure Revealed by the Afterglow Lightcurve and Polarization*
- ❖ **Invited Talk:** GRB Forum 2024, Athens, Greece 2024
Title: *Prompt GRB and Afterglow Polarization*
- ❖ **Invited Talk:** Thinkshop of Fast-Evolving Extragalactic Transients 2024
Title: *GW-Gamma-Rays Delays & Afterglow Polarization*
- ❖ **Colloquium:** IRyA-UNAM, Morelia, Mexico 2024
Title: *GRB Jet Structure & Magnetic Field Revealed by New Observations*
- ❖ **Invited Talk:** Bringing Theory into the Data Space, Geneva, Switzerland 2023
Title: *Spectro-Polarimetric Modeling of GRBs and Their Afterglows*
- ❖ **Talk:** GRB50: The Past, Present, and Future of GRBs, Warrenton, USA 2023
Title: *Steep and Shallow Jet Angular Structures Revealed by the Afterglows of Gamma-Ray Bursts*
- ❖ **Poster:** GRB50: The Past, Present, and Future of GRBs, Warrenton, USA 2023
Title: *Time-Dependent Linear Polarization Models of Prompt and Afterglow Emission in Gamma-Ray Bursts*
- ❖ **Invited Talk:** 19th Rencontres du Vietnam, Quy Nhon, Vietnam 2023
Title: *GRB Polarization: Theoretical Overview & Current Status*
- ❖ **Invited Online Talk:** Institute of Astrophysics Colloquium, Forth, Greece 2022
Title: *Angular Structure of Ultra-Relativistic Jets in GRBs*
- ❖ **Talk:** PASTO - Particle Acceleration in Astrophysical Objects, Rome, Italy 2022
Title: *Prompt GRB Polarization: Temporal Evolution & Energy Dependence*

-
- ❖ **Talk:** Astrophysical Polarimetry in the Time-Domain Era, Lecco, Italy 2022
Title: *Temporal Evolution of Prompt GRB Polarization*
 - ❖ **Colloquium:** IRyA-UNAM, Morelia, Mexico 2022
Title: *Angular Structure of Jets in Gamma-Ray Bursts*
 - ❖ **Invited Online Talk:** Seminar at Astrophysics Research Center of the Open University, Raanana, Israel 2022
Title: *Prompt GRB Polarization*
 - ❖ **Invited Review Talk:** 16th Marcel Grossmann Meeting, Rome 2021
Title: *Emission from Structured GRB Jets: Theoretical Overview*
 - ❖ **Invited Talk:** Ioffe Workshop on GRBs and other transient sources: 25 Years of Konus-Wind Experiment, St Petersburg, Russia 2019
Title: *Constraints on the binary NS merger remnant and outflow structure from EM counterparts of GW170817*
 - ❖ **Invited Talk:** Workshop to bring together experts on High Energy Astrophysics from Japan and Israel, Japan 2019
Title: *Polarization and afterglow of structured outflows: Insights gained from GW170817/GRB 170817A*
 - ❖ **Invited Talk:** Astronomy & Astrophysics Seminar, TIFR-Mumbai, India 2019
Title: *Insights gained from GW170817/GRB 170817A: BNS merger remnant and outflow structure*
 - ❖ **Invited Talk:** GRBs and Related Astrophysics in Multi-Messenger Era, Nanjing, China 2019
Title: *BNS merger remnant and outflow structure: Insights gained from GW170817/GRB 170817A*
 - ❖ **Invited Talk:** Shedding new light on Gamma-Ray Bursts with polarization data, Geneva 2018
Title: *Polarization of Gamma-Ray Burst Prompt Emission: An Overview*
 - ❖ **Invited Talk:** EXPUNIV 2018, Kolkata, India 2018
Title: *Probing the GRB prompt emission mechanism, magnetic field geometry, and jet structure with linear polarization*
 - ❖ **Invited Talk:** AstroCoffee, Goethe University, Frankfurt, Germany 2018
Title: *GRB 170817A / GW 170817: Constraining the Relativistic Outflow Structure and the Compact Remnant*

-
- | | |
|---|------|
| ❖ Invited Talk: 15th Marcel Grossmann Meeting, Rome, Italy
Title: <i>GRB 170817A / GW 170817: Constraining the Relativistic Outflow Structure and the Compact Remnant</i> | 2018 |
| ❖ Talk: 15th Marcel Grossmann Meeting, Rome, Italy
Title: <i>The Effect of Pair Cascades on the High-Energy Spectral Cutoffs in GRBs</i> | 2018 |
| ❖ Invited Talk: Astrolunch at the Hebrew University of Jerusalem, Israel
Title: <i>GRB Jets: Acceleration, Dissipation, & Radiation</i> | 2018 |
| ❖ Talk: Deciphering the Violent Universe, Cancun, Mexico
Title: <i>Lessons from the short GRB 170817A and off-axis emission from GRB Jets</i> | 2017 |
| ❖ Talk: High Energy Astrophysics Workshop, HUJI, Jerusalem, Israel
Title: <i>On the origin of the GeV/TeV emission from H.E.S.S. J1834-087</i> | 2017 |
| ❖ Talk: National Israeli Astronomy Seminar, Tel Aviv University.
Title: <i>What's Powering the Magnetar Wind Nebula Around Swift J1834.9-0846?</i> | 2017 |
| ❖ PiTP Summer School on Computational Plasma Astrophysics,
Institute for Advanced Study, Princeton, USA | 2016 |
| ❖ Talk: Dynamical Processes in Space Plasmas, Dead Sea, Israel
Title: <i>GRB Prompt phase Spectrum in High Sigma Outflows</i> | 2016 |
| ❖ Talk: AAS HEAD Meeting, Naples, Florida, USA
Title: <i>A Magnetar Wind Nebula: Is the Spin-down-powered Wind Enough?</i> | 2016 |
| ❖ Invited Talk: Seminar at the Ben Gurion University of the Negev, Israel
Title: <i>A Two-Zone Model for GRB Prompt Emission in Strongly Magnetized Outflows</i> | 2016 |
| ❖ Talk: Seminar at The Hebrew University of Jerusalem, Israel
Title: <i>A Two-Zone Model for GRB Prompt Emission in Strongly Magnetized Outflows</i> | 2015 |
| ❖ Talk: CASCA 2015, McMaster University, Ontario, Canada
Title: <i>Gamma-ray bursts from strongly magnetized outflows with dissipation from a baryon shell</i> | 2015 |
| ❖ Talk: The Structure and Signals of NSs: From Birth to Death, Florence, Italy
Title: <i>Statistical Ages and the Cooling Rate of XDINS</i> | 2014 |
| ❖ Talk: CASCA 2013, Vancouver, Canada | 2013 |

Title: *High Energy Processes in Relativistic Plasmas Near Compact Objects*

- ❖ **Talk:** 8th Patras Workshop on Axions, WISPS, WIMPS, Chicago, USA 2012
Title: *Constraints on Axion-Like Particles From Magnetic White Dwarfs*
- ❖ **Talk:** Canadian Workshop on the Nuclear and Astrophysics of Stars, TRIUMF, Vancouver, Canada 2010
Title: *Axion Properties from White Dwarf Magnetospheres*
- ❖ **Talk:** Theory Seminar, TRIUMF, Vancouver, Canada 2010
Title: *Mystery solved: Cosmic rays from pulsars and magnetars can explain ATIC, H.E.S.S., PAMELA, and Fermi observations*
- ❖ **Talk:** 24th Texas Symposium on Relativistic Astrophysics, Vancouver, Canada 2010
Title: *The Birthrate of Magnetars*

Submitted Publications:

1. O'Connor, B., **Gill, R.** et al. [Comprehensive X-ray Observations of the Exceptional Ultra-long X-ray and Gamma-ray Transient GRB 250702B with Swift, NuSTAR, and Chandra: Insights from the X-ray Afterglow Properties](#), ApJL, Submitted 2025
2. Carney, J. et al. [Optical/infrared observations of the extraordinary GRB 250702B: a highly obscured afterglow in a massive galaxy consistent with multiple possible progenitors](#), ApJL, Submitted 2025
3. Neights, E. et al. [GRB 250702B: Discovery of a Gamma-Ray Burst from a Black Hole Falling into a Star](#), MNRAS, Submitted 2025
4. O'Connor, B. et al. [The redshift distribution of Einstein Probe transients supports their relation to gamma-ray bursts](#), ApJL, Submitted 2025
5. Morales-Riviera, G., **Gill, R.** et al. [On the Efficiency of Producing Gamma-Ray Bursts from Isolated Population III Stars](#), MNRAS, Submitted 2025
6. Cendes, Y., Berger, E., Beniamini, P., **Gill, R.** et al. [Continued Rapid Radio Brightening of the Tidal Disruption Event AT2018hyz](#), ApJ, Submitted 2025

Refereed Publications:

7. Busmann, M. et al. [The curious case of EP241021a: Unraveling the mystery of its exceptional rebrightening](#), A&A, 701A, 225 2025
8. Fermi-LAT Collaboration. [GRB 221009A: the B.O.A.T Burst that Shines in Gamma Rays](#), ApJS, 277, 24 2024
9. O'Connor, B., Beniamini, P., and **Gill, R.** [X-ray Afterglow limits on the viewing angles of short gamma-ray bursts](#), MNRAS, 533, 1629 2024
10. Birenbaum, G., **Gill, R.**, Bromberg, O. et al. [Afterglow Linear Polarization Signatures from Shallow GRB Jets: Implications for Energetic GRBs](#), ApJ, 2024

-
- 974, 308
11. **Gill, R.** and Granot, J. *Prompt GRB Polarization from Non-Axisymmetric Jets*, 2023
MNRAS, 527, 12178
 12. **Gill, R.** and Granot, J. *GRB 221009A Afterglow from a Shallow Angular Structured Jet*, MNRAS Letters, 524, L78 2023
 13. Fermi-GBM Collaboration. *Fermi-GBM Discovery of GRB 221009A: An Extraordinarily Bright GRB from Onset to Afterglow*, ApJ Letters, 952, 42 2023
 14. O'Connor, B., Troja, E., Ryan, G. et al. *A structured jet explains the extreme GRB 221009A*, Science Advances, 9, eadi1405 2023
 15. Arimoto, M., Asano, K., Kawabata, K. S. et al. *Gamma rays from a reverse shock with turbulent magnetic fields in GRB 180720B*, Nature Astronomy, 8, 134 2023
 16. Kumar, P., **Gill, R.**, and Lu, W. *Propagation of Alfvén waves in the charge starvation regime*, MNRAS, 516, 2697 2022
 17. Beniamini, P., **Gill, R.**, and Granot, J. *Robust Features of Off-Axis Gamma-Ray Burst Afterglow Lightcurves*, MNRAS, 515, 555 2022
 18. **Gill, R.** and Granot, J. *Gamma-Ray Bursts at TeV Energies: Theoretical Considerations*, Galaxies, 10, 74 2022
 19. The Gamow Explorer Team, *The Gamow Explorer: A gamma-ray burst observatory to study the high redshift universe and enable multi-messenger astrophysics*, Proc. SPIE 11821 2021
 20. **Gill, R.**, Kole, M., and Granot, J. *GRB Polarization: A Unique Probe of GRB Physics*, Galaxies, 9, 82 2021
 21. **Gill, R.** and Granot, J. *Temporal Evolution of Prompt GRB Polarization*, MNRAS, 504, 1939 2021
 22. Fermi-LAT Collaboration. *High-Energy Emission from a Magnetar Giant Flare in the Sculptor Galaxy*, Nature Astronomy, 5, 385 2021
 23. Nathanail, A., **Gill, R.**, Porth, O. et al. *3D Magnetised Jet Break-Out From Neutron-Star Binary Merger Ejecta: Afterglow Emission From the Jet and the Ejecta*, MNRAS, 502, 1843 2021
 24. **Gill, R.**, Granot, J., & Beniamini, P. *GRB Spectrum from Gradual Dissipation in a Magnetized Outflow*, MNRAS, 499, 1356 2020
 25. Nathanail, A., **Gill, R.**, Porth, O. et al. *On the opening angle of magnetised jets from neutron-star mergers: the case of GRB170817A*, MNRAS, 495, 3780 2020
 26. Beniamini, P., Granot, J., & **Gill, R.** *Afterglow Lightcurves from Misaligned Structured Jets*, MNRAS, 493, 3521 2020
 27. **Gill, R.** and Granot, J. *Constraining the magnetic field structure in collisionless relativistic shocks with a radio afterglow polarization upper limit in GW170817*, MNRAS, 491, 5815 2020
 28. **Gill, R.**, Granot, J., & Kumar, P. *Linear polarization in gamma-ray burst prompt emission*, MNRAS, 491, 3343 2020
 29. Fermi-LAT Collaboration. *Fermi and Swift Observations of GRB 190114C: Tracing the Evolution of High-Energy Emission from Prompt to Afterglow*, ApJ, 890, 9 2020

-
30. MAGIC Collaboration & Fermi Collaboration. *Observation of inverse Compton emission from a long gamma-ray burst*, Nature, 575, 459 2019
 31. Laskar, T., Alexander, K. D., **Gill, R.** et al. *ALMA Detection of a Linearly Polarized Reverse Shock in GRB 190114C*, ApJ Letters, 878, L26 2019
 32. **Gill, R.**, Granot, J., De Colle, F. et al. *Numerical Simulations of an Initially Top-Hat Jet and the Afterglow of GW170817/GRB170817A*, ApJ, 883, 15 2019
 33. **Gill, R.**, Nathanail, A., & Rezzolla, L. *When Did the Remnant of GW170817 Collapse to a Black Hole?*, ApJ, 876, 139 2019
 34. eXTP Collaboration. *Observatory science with eXTP*, SCPMA, 62, 42 2019
 35. Granot, J., **Gill, R.**, Guetta, D. et al. *Off-Axis Emission of Short GRB Jets from Double Neutron Star Mergers and GRB 170817A*, MNRAS, 481, 1597 2018
 36. Vianello, G., **Gill, R.**, Granot, J. et al. *The Bright and the Slow -- GRBs 100724B & 160509A with High-energy Cutoffs at < 100 MeV*, ApJ, 864, 163 2018
 37. **Gill, R.** & Granot, J. *Afterglow Imaging and Polarization of Misaligned Structured GRB Jets and Cocoons: Breaking the Degeneracy in GRB 170817A*, MNRAS, 478, 4128 2018
 38. **Gill, R.** & Granot, J. *The Effect of Pair Cascades on the High-Energy Spectral Cutoff in Gamma-Ray Bursts*, MNRAS Letters, 475, 1 2018
 39. **Gill, R.**, Granot, J., & Lyubarsky, Y. *2D Relativistic MHD Simulations of the Kruskal-Schwarzschild Instability in a Relativistic Striped Wind*, MNRAS, 474, 3535 2018
 40. Fermi-LAT Collaboration. *Fermi-LAT Observations of LIGO / Virgo Event GW170817*, ApJ, 861, 85 2018
 41. Granot, J., Guetta, D., & **Gill, R.** *Lessons from the short GRB170817A -- the First Gravitational Wave Detection of a Binary Neutron Star Merger*, ApJ Letters, 850, 24 2018
 42. Younes, G., Kouveliotou, C., Jaodand, A. et al. *X-ray and radio observations of the magnetar SGR J1935+2154 during its 2014, 2015, and 2016 outbursts*, ApJ, 847, 15 2017
 43. Gogus, E., Lin, L., Roberts, O. J. et al. *Burst and Outburst Characteristics of Magnetar 4U 0142+61*, ApJ, 835, 68 2017
 44. Granot, J., **Gill, R.**, Younes, G. et al. *Learning About the Magnetar Swift J1834.9-0846 from its Wind Nebula*, MNRAS, 464, 4895 2017
 45. Fermi-LAT Collaboration. *Searching the Gamma-ray Sky for Counterparts to Gravitational Wave Sources: Fermi GBM and LAT Observations of LVT151012 and GW151226*, ApJ, 835, 82 2017
 46. Guiriec, S., Kouveliotou, C., Hartmann, D. H. et al. *A Unified Model for GRB Prompt Emission from Optical to Gamma-Rays; a New Type of Standard Candle*, ApJ Letters, 831, 8 2016
 47. Younes, G., Kouveliotou, C., Kargaltsev, O. *The wind nebula around magnetar Swift J1834.9-0846*, ApJ, 824, 138 2016
 48. **Gill, R.**, & Thompson, C. *Non-thermal Gamma-ray Emission from Delayed Pair Breakdown in a Magnetized and Photon-rich Outflow*, ApJ, 796, 81 2014
 49. Thompson, C., & **Gill, R.** *Hot Electromagnetic Outflows. III. Displaced* 2014

-
- Fireball in a Strong Magnetic Field*, ApJ, 791, 30
50. **Gill, R.,** & Heyl, J. *Statistical ages and the cooling rate of X-ray dim isolated neutron stars*, MNRAS, 435, 3243 2013
 51. **Gill, R.,** & Heyl, J. *Constraining the photon-axion coupling constant with magnetic white dwarfs*, Phys. Rev. D, 84, 085001 2011
 52. Heyl, J., **Gill, R.,** & Hernquist, L. *Cosmic Rays from Pulsars and Magnetars*, MNRAS Letters, 406, L25 2010
 53. **Gill, R.,** & Heyl, J. *On the trigger mechanisms for SGR giant flares*, MNRAS, 407, 1926 2010
 54. **Gill, R.,** & Heyl, J. *Dispersion Relations for Bernstein Waves in a Relativistic Pair Plasma*, Phys. Rev. E, 80, 036407 2009
 55. **Gill, R.,** & Heyl, J. *The Birthrate of Magnetars*, MNRAS, 381, 52 2007