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Research Interests

- **EM signatures of compact object mergers:** Merger remnants and their lifetimes, kilonova physics, relativistic jet launching, dynamics, and prompt and afterglow emission.
- **GRB and AGN jets:** Spectral modeling of jets, radiation transfer, kinetic simulations, MHD simulations of jets, jet geometry and composition, high energy processes
- **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
- **Axions:** Constraints on axion properties from astrophysical sources, polarization measurements, and blazars

Employment

- **Instituto de Radioastronomía y Astrofísica** 2021 - Present
Assistant Professor
- **The George Washington University** 2019 - 2021
Postdoctoral Fellow
- **The Open University of Israel** 2015 - 2021
Postdoctoral Fellow
- **Institute for Theoretical Physics, Goethe University** 2018 - 2019
Visiting Research Scholar
- **Canadian Institute for Theoretical Astrophysics** 2012 - 2015
Postdoctoral Fellow

Education

- **PhD in Astrophysics** Nov, 2012
University of British Columbia
Thesis: *Astrophysical Plasmas Near Strongly Magnetized Compact Objects*
Advisor: *Prof. Jeremy Heyl*
- **BSc in Physics and Astronomy (Hons.)** 2007
University of British Columbia

Awards

■ Open University of Israel Fellowship	2017 - 2018
■ 100,000 cpu hrs on SuperMUC supercomputer	2017
■ 100,000 cpu hrs on HazelHen supercomputer	2017
■ University Research Fund (OUI)	2016 - 2017
■ Outstanding Postdoctoral Researcher Fellowship (OUI)	2015 - 2016
■ CITA Fellowship	2012 - 2015
■ NSERC Canada Graduate Scholarship	2009 - 2012
■ Four Year Fellowship (UBC)	2009 - 2012
■ Graduate Research Mobility Award (UBC)	2009
■ Graduate Entrance Scholarship (UBC)	2007

Publications

1. Beniamini, P., **Gill, R.**, & Granot, J. [Robust Features of Off-Axis Gamma-Ray Burst Afterglow Lightcurves](#), 2022, Submitted to MNRAS
2. **Gill, R.** & Granot, J. Gamma-Ray Bursts at TeV Energies: Theoretical Considerations, 2022, *Galaxies*, 10, 74
3. The Gamow Explorer Team. [The Gamow Explorer: A gamma-ray burst observatory to study the high redshift universe and enable multi-messenger astrophysics](#), 2021, Proc. SPIE 11821
4. **Gill, R.**, Kole, M., & Granot, J. [GRB Polarization: A Unique Probe of GRB Physics](#), 2021, *Galaxies*, 9, 82
5. **Gill, R.** & Granot, J. [Temporal Evolution of Prompt GRB Polarization](#), 2021, MNRAS, 504, 1939
6. Fermi Collaboration. High-Energy Emission from a Magnetar Giant Flare in the Sculptor Galaxy, 2021, **Nature Astronomy**, 5, 385
7. Nathanael, A., **Gill, R.**, Porth, O., Fromm, C. M., & Rezzolla, L. [3D magnetised jet break-out from neutron-star binary merger ejecta: afterglow emission from the jet and the ejecta](#), 2021, MNRAS, 502, 1843
8. **Gill, R.**, Granot, J., & Beniamini, P. [GRB Spectrum from Gradual Dissipation in a Magnetized Outflow](#), 2020, MNRAS, 499, 1356
9. Nathanael, A., **Gill, R.**, Porth, O., Fromm, C. M., & Rezzolla, L. [On the opening angle of magnetised jets from neutron-star mergers: the case of GRB170817A](#), 2020, MNRAS, 495, 3780
10. Beniamini, P., Granot, J., & **Gill, R.** [Afterglow Lightcurves from Misaligned Structured Jets](#), 2020, MNRAS, 493, 3521
11. **Gill, R.** and Granot, J. [Constraining the magnetic field structure in collisionless relativistic shocks with a radio afterglow polarization upper limit in GW170817](#), 2020, MNRAS, 491, 5815
12. **Gill, R.**, Granot, J., & Kumar, P. [Linear polarization in gamma-ray burst prompt emission](#), 2020, MNRAS, 491, 3343

13. Fermi Collaboration. [Fermi and Swift Observations of GRB 190114C: Tracing the Evolution of High-Energy Emission from Prompt to Afterglow](#), 2019, *ApJ*, 890, 9
14. MAGIC & Fermi Collaboration. [Observation of inverse Compton emission from a long gamma-ray burst](#), 2019, *Nature*, 575, 459
15. Laskar, T., Alexander, K. D., **Gill, R.** et al. [ALMA Detection of a Linearly Polarized Reverse Shock in GRB 190114C](#), 2019, *ApJL*, 878, L26
16. **Gill, R.**, Granot, J., De Colle, F., & Urrutia, G. [Numerical Simulations of an Initially Top-Hat Jet and the Afterglow of GW170817/GRB170817A](#), 2019, *ApJ*, 883, 15
17. **Gill, R.**, Nathanael, A., & Rezzolla, L. [When Did the Remnant of GW170817 Collapse to a Black Hole?](#), 2019, *ApJ*, 876, 139
18. eXTP Collaboration. [Observatory Science with eXTP](#), 2019, *SCPMA*, 62, 42
19. Granot, J., **Gill, R.**, Guetta, D., & De Colle, F. [Off-axis emission of short GRB jets from double neutron star mergers and GRB 170817A](#), 2018, *MNRAS*, 481, 1597
20. Vianello, G., **Gill, R.**, Granot, J. Omodei, N., Cohen-Tanugi, J., & Longo, F. [The Bright and the Slow – GRBs 100724B & 160509A with High-energy Cutoffs at \$\lesssim 100\$ MeV](#), 2018, *ApJ*, 864, 163
21. **Gill, R.** & Granot, J. [Afterglow Imaging and Polarization of Misaligned Structured GRB Jets and Cocoons: Breaking the Degeneracy in GRB 170817A](#), 2018, *MNRAS*, 478, 4128
22. **Gill, R.** & Granot, J. [The Effect of Pair Cascades on the High-Energy Spectral Cutoff in Gamma-Ray Bursts](#), 2018, *MNRAS Letters*, 475, 1
23. **Gill, R.**, Granot, J., & Lyubarsky, Y. [2D Relativistic MHD Simulations of the Kruskal-Schwarzschild Instability in a Relativistic Striped Wind](#), 2018, *MNRAS*, 474, 3535
24. Fermi Collaboration. [Fermi-LAT Observations of LIGO / Virgo Event GW170817](#), 2018, *ApJ*, 861, 85
25. Granot, J., Guetta, D. & **Gill, R.** [Lessons from the short GRB170817A – the First Gravitational Wave Detection of a Binary Neutron Star Merger](#), 2017, *ApJL*, 850, 24
26. Younes, G., Kouveliotou, C., Jaodand, A., Baring, M. G., van der Horst, A. J., Harding, A. K., Hessels, J. W. T., Gehrels, N., **Gill, R.**, Huppenkothen, D., Granot, J., Göğüş, E., & Lin, L. [X-ray and radio observations of the magnetar SGR J1935+2154 during its 2014, 2015, and 2016 outbursts](#), 2017, *ApJ*, 847, 15
27. Göğüş, E., Lin, L., Roberts, O. J., Chakraborty, M., Kaneko, Y., **Gill, R.**, Granot, J., van der Horst, A. J., Watts, A. L., Baring, M. G., Kouveliotou, C. Huppenkothen, D., & Younes, G. [Burst and Outburst Characteristics of Magnetar 4U 0142+61](#), 2017, *ApJ*, 835, 68
28. Fermi Collaboration. [Searching the Gamma-ray Sky for Counterparts to Gravitational Wave Sources: Fermi GBM and LAT Observations of LVT151012 and GW151226](#), 2017, *ApJ*, 835, 82

29. Granot, J., **Gill, R.**, Younes, G., Gelfand, J., Harding, A., Kouveliotou, C., & Baring, M. G. [Learning About the Magnetar Swift J1834.9-0846 from its Wind Nebula](#), 2017, MNRAS, 464, 4895
30. Guiriec, S., Kouveliotou, C., Hartmann, D. H., Granot, J., Asano, K., Meszaros, P., **Gill, R.**, Gehrels, N., & McEnery, J. [A Unified Model for GRB Prompt Emission from Optical to Gamma-Rays; a New Type of Standard Candle](#), 2016, ApJ, 831L, 8
31. Younes, G., Kouveliotou, C., Kargaltsev, O., **Gill, R.**, Granot, J., Watts, A. L., Gelfand, J., Baring, M. G., Harding, A., Pavlov, G. G., van der Horst, A. J., Huppenkothen, D., Göğüş, E., Lin, L., & Roberts, O. J. [The wind nebula around magnetar Swift J1834.9-0846](#), 2016, ApJ, 824, 138
32. Thompson, C. & **Gill, R.** [Pulse Structure of Hot Electromagnetic Outflows with Embedded Baryons](#), 2014, ArXiv:1406.5239
33. **Gill, R.** & Thompson, C. [Non-Thermal Gamma-Ray Emission from Delayed Pair-Breakdown in a Magnetized and Photon-Rich Outflow](#), 2014, ApJ, 796, 81
34. Thompson, C. & **Gill, R.** [Hot Electromagnetic Outflows. III. Displaced Fireball in a Strong Magnetic Field](#), 2014, ApJ, 791, 30
35. **Gill, R.** & Heyl, J. [Statistical Ages and the Cooling Rate of X-Ray Dim Isolated Neutron Stars](#), 2014, MNRAS, 435, 3243
36. **Gill, R.** & Heyl, J. [Constraining the Photon-Axion Coupling Constant with Magnetic White Dwarfs](#), 2011, PRD, 84, 085001
37. Heyl, J., **Gill, R.** & Hernquist, L. [Cosmic Rays from Pulsars and Magnetars](#), 2010, MNRAS, 406, L25
38. **Gill, R.** & Heyl, J. [On the Trigger Mechanisms of Soft Gamma-Repeater Giant Flares](#), 2010, MNRAS, 407, 1926
39. **Gill, R.** & Heyl, J. [Dispersion Relations for Bernstein Waves in a Relativistic Plasma](#), 2009, PRE, 80, 036407
40. **Gill, R.** & Heyl, J. [The Birthrate of Magnetars](#), 2007, MNRAS, 381, 52

Conferences, Seminars, & Workshops

1. **Invited Talk:** Colloquium at IRyA
Title: *Angular Structure of Jets in Gamma-Ray Bursts* 2022
2. **Invited Online Talk:** Seminar at ARCO
Title: *Prompt GRB Polarization* 2022
3. **Invited Review Talk:** 16th Marcel Grossmann Meeting, Rome.
Title: *Emission from Structured GRB Jets: Theoretical Overview* 2021
4. **Invited Online Talk:** High-Energy Astrophysics Seminar Series, UNAM, Mexico
Title: *Gamma-ray bursts: The mystery being resolved & new prospects* 2020

- Invited Talk:** Ioffe Workshop on GRBs and other transient sources: 25 Years of Konus-Wind Experiment, St Petersburg, Russia.
5. Title: *Constraints on the binary NS merger remnant and outflow structure from EM counterparts of GW170817* 2019
- Invited Talk:** Workshop to bring together experts on High Energy Astrophysics from Japan and Israel, Japan.
6. Title: *Polarization and afterglow of structured outflows: Insights gained from GW170817/GRB 170817A* 2019
- Invited Talk:** Astronomy & Astrophysics Seminar, TIFR-Mumbai.
7. Title: *Insights gained from GW170817/GRB 170817A: BNS merger remnant and outflow structure* 2019
- Gamma-Ray Bursts and Related Astrophysics in Multi-Messenger Era, Nanjing, China.
8. Title: *BNS merger remnant and outflow structure: Insights gained from GW170817/GRB 170817A* 2019
- Invited Talk:** Shedding new light on Gamma-Ray Bursts with polarization data, Geneva.
9. Title: *Polarization of Gamma-Ray Burst Prompt Emission: An Overview* 2018
- Invited Talk:** EXPUNIV 2018, Kolkata.
10. Title: *Probing the GRB prompt emission mechanism, magnetic field geometry, and jet structure with linear polarization* 2018
- Invited Talk:** AstroCoffee, Goethe University, Frankfurt.
11. Title: *GRB 170817A / GW 170817: Constraining the Relativistic Outflow Structure and the Compact Remnant* 2018
- Invited Talk:** 15th Marcel Grossmann Meeting, Rome.
12. Title: *GRB 170817A / GW 170817: Constraining the Relativistic Outflow Structure and the Compact Remnant* 2018
- 15th Marcel Grossmann Meeting, Rome.
13. Title: *The Effect of Pair Cascades on the High-Energy Spectral Cutoffs in GRBs* 2018
- Invited Talk:** Astrolunch at the Hebrew University of Jerusalem.
14. Title: *GRB Jets: Acceleration, Dissipation, & Radiation* 2018
- Deciphering the Violent Universe, Cancún, Mexico. Title: *Lessons from the short GRB 170817A and off-axis emission from GRB jets* 2017
- 15.
- High Energy Astrophysics Workshop, HUJI, Jerusalem. Title: *On the origin of the GeV/TeV emission from H.E.S.S. J1834-087* 2017
- 16.
- National Israeli Astronomy Seminar, Tel Aviv University. Title: *What's Powering the Magnetar Wind Nebula Around Swift J1834.9-0846?* 2017
- 17.

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| 18. | PiTP Summer School on <i>Computational Plasma Astrophysics</i> , Institute for Advanced Study, Princeton | 2016 |
| 19. | Dynamical Processes in Space Plasmas, Dead Sea, Israel. Title: <i>GRB Prompt-phase Spectrum in High Sigma Outflows</i> | 2016 |
| 20. | AAS HEAD Meeting, Naples, Florida. Title: <i>A Magnetar Wind Nebula: Is the Spin-down-powered Wind Enough?</i> | 2016 |
| 21. | Invited Talk: Ben Gurion University of the Negev. Title: <i>A Two-Zone Model for GRB Prompt Emission in Strongly Magnetized Outflows</i> | 2016 |
| 22. | The Racah Institute of Physics, HUJI. Title: <i>A Two-Zone Model for GRB Prompt Emission in Strongly Magnetized Outflows</i> | 2015 |
| 23. | CASCA 2015. McMaster University. Title: <i>Gamma-ray bursts from strongly magnetized outflows with dissipation from a baryon shell</i> | 2015 |
| 24. | CITA. Title: <i>The Spectral States of Black Hole X-Ray Binaries</i> | 2014 |
| 25. | The Structure and Signals of Neutron Stars: From Birth to Death. Florence. Title: <i>Statistical Ages and the Cooling Rate of XDINS</i> | 2014 |
| 26. | CITA. Title: <i>Models of GRBs</i> | 2014 |
| 27. | CASCA 2013. Vancouver. Title: <i>Study of High Energy Processes in Relativistic Plasmas Near Compact Objects</i> | 2013 |
| 28. | 8th Patras Workshop on Axions, WISPS, WIMPS. Chicago. Title: <i>Constraints on Axion-Like Particles From Magnetic White Dwarfs</i> | 2012 |
| 29. | Canadian Workshop on the Nuclear and Astrophysics of Stars. TRIUMF. Title: <i>Axion Properties from White Dwarf Magnetospheres</i> | 2010 |
| 30. | Theory Seminar. TRIUMF. Title: <i>Mystery solved: Cosmic rays from pulsars and magnetars can explain ATIC, H.E.S.S., PAMELA, and Fermi observations</i> | 2010 |
| 31. | 24th Texas Symposium on Relativistic Astrophysics. Vancouver. Title: <i>The Birthrate of Magnetars</i> | 2008 |

Academic Associations

1. Fermi-LAT Collaboration
2. eXTP - enhanced X-ray Timing and Polarimetry mission
3. POLAR - 1 & 2
4. Gamow Explorer Mission

Computer Skills

1. Linux/Unix, C, Python, Mathematica

Academic Services

1. Referee for Journals: Science, ApJ, Physical Review B, MNRAS, JCAP, Galaxies
2. Panelist for NASA/Fermi Proposal Selection

References**Prof. Jeremy Heyl**

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Prof. Luciano Rezzolla

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D-60438 Frankfurt
Germany
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rezzolla@itp.uni-frankfurt.de