Ramandeep Gill

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Nationality: Canadian

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

- **The Open University of Israel** 2015 - Present
  Postdoctoral Fellow
  Topic: *Gamma-ray bursts and magnetars*
  Advisor: *Prof. Jonathan Granot*

- **Institute for Theoretical Physics, Goethe University, Frankfurt** 2018 - 2019
  Research Associate
  Topic: *EM signatures of BNS mergers*
  Advisor: *Prof. Luciano Rezzolla*

- **Canadian Institute for Theoretical Astrophysics** 2012 - 2015
  Postdoctoral Fellow
  Topic: *Strongly magnetized relativistic outflows and gamma-ray bursts*
  Advisor: *Prof. Chris Thompson*

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
  Thesis: *The Birthrate of Magnetars*

Advisor: *Prof. Jeremy Heyl*

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

Teaching & Outreach Experience

- **Mentored PhD student at the University of Toronto** 2013 - 2014
  – Gave tutorials on high-energy radiative processes in astrophysics
  – Showed the student how to simulate radiative processes using a computer code

- **Teaching assistant for 1^{st}-year astronomy lab course at UBC** 2007 - 2009
  – Delivered lectures on introductory topics in astronomy
  – Helped students in carrying out lab experiments and understanding core concepts

- **Tours of the night sky using the 14-inch UBC telescope** 2007 - 2012
  – Gave public tours of the night sky every clear Saturday/Sunday night
  – Showed Venus, Mars, Jupiter, Saturn, Andromeda galaxy, globular clusters, etc.
  – Answered general questions about the planets, stars, and the Universe.

- **Lecturer for astronomy summer school at UBC** 2010
  – Gave lectures on introductory astronomy to elementary school students
  – Designed and administered various experiments, e.g. bottle rocket, diptych dial, etc.

Publications

1. Laskar, T., Alexander, K. D., **Gill, R.** et al. ALMA Detection of a Linearly Polarized Reverse Shock in GRB 190114C, 2019, *Accepted to ApJL.*

2. **Gill, R.**, Granot, J., De Colle, F., & Urrutia, G. Even an Initially Top-Hat Jet can Fit the Afterglow of GW170817/GRB170817A, 2019, *Accepted to ApJ.*

3. **Gill, R.**, Nathanail, A., & Rezzolla, L. When Did the Remnant of GW170817 Collapse to a Black Hole?, 2019, ApJ, 876, 139.

4. **Gill, R.**, Granot, J., & Kumar, P. Linear polarization in gamma-ray burst prompt emission, 2018, *Submitted to MNRAS.*

5. eXTP Collaboration (+ **Gill, R.** +). Observatory Science with eXTP, 2019, SCPMA, 62, 42

6. 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

7. 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

8. **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

9. **Gill, R.** & Granot, J. The Effect of Pair Cascades on the High-Energy Spectral Cutoff in Gamma-Ray Bursts, 2018, MNRAS Letters, 475, 1

10. **Gill, R.**, Granot, J., & Lyubarsky, Y. 2D Relativistic MHD Simulations of the Kruskal-Schwarzschild Instability in a Relativistic Striped Wind, 2018, MNRAS, 474, 3535

11. Ajello, M. et al. (+ **Gill, R.** +). Fermi-LAT Observations of LIGO / Virgo Event GW170817, 2018, ApJ, 861, 85

12. 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

13. 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

14. 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

15. Fermi-Collaboration(+ **Gill, R.** +). Searching the Gamma-ray Sky for Counterparts to Gravitational Wave Sources: Fermi GBM and LAT Observations of LVT151012 and GW151226, 2017, ApJ, 835, 82

16. 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

17. 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

18. 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

19. Thompson, C. & **Gill, R**. Pulse Structure of Hot Electromagnetic Outflows with Embedded Baryons, 2014, ArXiv:1406.5239

20. **Gill, R.** & Thompson, C. Non-Thermal Gamma-Ray Emission from Delayed Pair-Breakdown in a Magnetized and Photon-Rich Outflow, 2014, ApJ, 796, 81

21. Thompson, C. & **Gill, R**. Hot Electromagnetic Outflows. III. Displaced Fireball in a Strong Magnetic Field, 2014, ApJ, 791, 30

22. **Gill, R.** & Heyl, J. Statistical Ages and the Cooling Rate of X-Ray Dim Isolated Neutron Stars, 2014, MNRAS, 435, 3243

23. **Gill, R.** & Heyl, J. Constraining the Photon-Axion Coupling Constant with Magnetic White Dwarfs, 2011, PRD, 84, 085001

24. Heyl, J., **Gill, R.** & Hernquist, L. Cosmic Rays from Pulsars and Magnetars, 2010, MNRAS, 406, L25

25. **Gill, R.** & Heyl, J. On the Trigger Mechanisms of Soft Gamma-Repeater Giant Flares, 2010, MNRAS, 407, 1926

26. **Gill, R.** & Heyl, J. Dispersion Relations for Bernstein Waves in a Relativistic Plasma, 2009, PRE, 80, 036407

27. **Gill, R.** & Heyl, J. The Birthrate of Magnetars, 2007, MNRAS, 381, 52

Conferences, Seminars, & Workshops

1.	**Invited Talk**: Astronomy & Astrophysics Seminar, TIFR-Mumbai. Title: *Insights gained from GW170817/GRB 170817A: BNS merger remnant and outflow structure*	2019
2.	Gamma-Ray Bursts and Related Astrophysics in Multi-Messenger Era, Nanjing, China. Title: *BNS merger remnant and outflow structure: Insights gained from GW170817/GRB 170817A*	2019
3.	**Invited Talk**: Shedding new light on Gamma-Ray Bursts with polarization data, Geneva. Title: *Polarization of Gamma-Ray Burst Prompt Emission: An Overview*	2018
4.	**Invited Talk**: EXPUNIV 2018, Kolkata. Title: *Probing the GRB prompt emission mechanism, magnetic field geometry, and jet structure with linear polarization*	2018
5.	**Invited Talk**: AstroCoffee, Goethe University, Frankfurt. Title: *GRB 170817A / GW 170817: Constraining the Relativistic Outflow Structure and the Compact Remnant*	2018
6.	**Invited Talk**: 15$^{\text{th}}$ Marcel Grossmann Meeting, Rome. Title: *GRB 170817A / GW 170817: Constraining the Relativistic Outflow Structure and the Compact Remnant*	2018
7.	15$^{\text{th}}$ Marcel Grossmann Meeting, Rome. Title: *The Effect of Pair Cascades on the High-Energy Spectral Cutoffs in GRBs*	2018

8.	**Invited Talk**: Astrolunch at the Hebrew University of Jerusalem. Title: *GRB Jets: Acceleration, Dissipation, & Radiation*	2018
9.	Deciphering the Violent Universe, Cancún, Mexico. Title: *Lessons from the short GRB 170817A and off-axis emission from GRB jets*	2017
10.	High Energy Astrophysics Workshop, HUJI, Jerusalem. Title: *On the origin of the GeV/TeV emission from H.E.S.S. J1834-087*	2017
11.	National Israeli Astronomy Seminar, Tel Aviv University. Title: *What's Powering the Magnetar Wind Nebula Around Swift J1834.9-0846?*	2017
12.	PiTP Summer School on *Computational Plasma Astrophysics*, Institute for Advanced Study, Princeton	2016
13.	Dynamical Processes in Space Plasmas, Dead Sea, Israel. Title: *GRB Prompt-phase Spectrum in High Sigma Outflows*	2016
14.	AAS HEAD Meeting, Naples, Florida. Title: *A Magnetar Wind Nebula: Is the Spin-down-powered Wind Enough?*	2016
15.	**Invited Talk**: Ben Gurion University of the Negev. Title: *A Two-Zone Model for GRB Prompt Emission in Strongly Magnetized Outflows*	2016
16.	The Racah Institute of Physics, HUJI. Title: *A Two-Zone Model for GRB Prompt Emission in Strongly Magnetized Outflows*	2015
17.	CASCA 2015. McMaster University. Title: *Gamma-ray bursts from strongly magnetized outflows with dissipation from a baryon shell*	2015
18.	CITA. Title: *The Spectral States of Black Hole X-Ray Binaries*	2014
19.	The Structure and Signals of Neutron Stars: From Birth to Death. Florence. Title: *Statistical Ages and the Cooling Rate of XDINS*	2014
20.	CITA. Title: *Models of GRBs*	2014
21.	CASCA 2013. Vancouver. Title: *Study of High Energy Processes in Relativistic Plasmas Near Compact Objects*	2013
22.	8th Patras Workshop on Axions, WISPS, WIMPS. Chicago. Title: *Constraints on Axion-Like Particles From Magnetic White Dwarfs*	2012
23.	Canadian Workshop on the Nuclear and Astrophysics of Stars. TRIUMF. Title: *Axion Properties from White Dwarf Magnetospheres*	2010
24.	Theory Seminar. TRIUMF. Title: *Mystery solved: Cosmic rays from pulsars and magnetars can explain ATIC, H.E.S.S., PAMELA, and Fermi observations*	2010

25. 24th Texas Symposium on Relativistic Astrophysics. Vancouver. Title: *The Birthrate of Magnetars* 2008

Academic Associations

1. Magnetar group led by Prof. Chryssa Kouveliotou (GWU)
2. Fermi-GRB Collaboration
3. eXTP - enhanced X-ray Timing and Polarimetry mission

Computer Skills

1. Linux/Unix, C, Mathematica, Python

Academic Services

1. Referee for Journals: ApJ, Physical Review B, MNRAS

References

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