Ryosuke Hirai

Curriculum Vitae

Personal Information

Name	Ryosuke Hirai (平井 遼介)
Nationality	Japanese
Gender	Male
Date of Birth	12th August, 1989
Email	ryosuke.hirai@monash.edu

Research Interests

2012–	Binary stars and supernovae
2015–	Efficient numerical schemes for difference equations
2018–	Stellar mergers
2021–	Wind accretion in close binaries

Education

2014–2017	**Doctor of Science**, *Waseda University*, Advanced Research Institute of Science and Engineering.
2012–2014	**Master of Science**, *Waseda University*, Advanced Research Institute of Science and Engineering.
2008–2012	**Bachelor of Engineering**, *Waseda University*, School of Advanced Science and Engineering.

Research Experience

2019.12–	**Research Fellow**, *at School of Physics and Astronomy*, Monash University.
2017–2019	**JSPS Overseas Research Fellow**, *at Department of Physics*, University of Oxford.
2017.4–10	**JSPS Research Fellow (PD)**, *at Advanced Research Institute of Science and Engineering*, Waseda University.
2016–2017	**JSPS Research Fellow (DC2)**, *at Advanced Research Institute of Science and Engineering*, Waseda University.

Teaching Experience

2021.6–9	**Co-supervisor**, *2 winter project students*, Monash University.
2020.7–10	**Teaching Assistant**, *PHS1022 (Waves and Quantum Physics)*, Monash University.

2020.9– **Co-supervisor**, *PhD student*, Monash University.

2014–2017 **Teaching Assistant**, *Introductory Physics*, Waseda University.

Grants

2018 **Hayakawa Satio Fund, Astronomical Society of Japan**, *∼210000 JPY*.

2016–2017 **JSPS Research Fellow (DC2), Fellowship + Grant**, *1200000+1100000 JPY*.

2015 **Research Grant for Young Scientists, Early Bird Program from Waseda Research Institute for Science and Engineering**, *400000 JPY*.

Languages

Japanese **Mothertongue**

English **Fluent** *Spent 8.5 years of childhood in England*

Service

2021– **Program chair**, *ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav), Relativistic Astrophysics program*.

2021– **Referee**, *Galaxies*.

2020– **Seminar/Colloquia organiser**, *Monash University*.

2020– **Referee**, *Publications of the Astronomical Society of Japan*.

2019– **Referee**, *Monthly Notices of the Royal Astronomical Society*.

2018–2019 **SPI-MAX seminar series organiser**, *University of Oxford*.

2015–2017 **Seminar organiser**, *Waseda University*.

Membership

2016– **Rironkon (Theoretical astrophysics society of Japan)**.

2015– **Astronomical Society of Japan**.

Publications

First Author

[9] **Observable black hole high-mass X-ray binaries must have >80% Roche lobe filling companions**
Ryosuke Hirai, Ilya Mandel
submitted to *Publications of the Astronomical Society of Australia*

[8] **Simulating the formation of η Carinae's surrounding nebula through unstable triple evolution and stellar merger-induced eruption**
Ryosuke Hirai, Philipp Podsiadlowski, Stanley Owocki, Fabian R. N. Schneider, Nathan Smith
Monthly Notices of the Royal Astronomical Society, Volume 503, Issue 3, pp.4276-4296 (2021)

[7] **Formation pathway for lonely stripped-envelope supernova progenitors: implications for Cassiopeia A**
Ryosuke Hirai, Toshiki Sato, Philipp Podsiadlowski, Alejandro Vigna-Gómez, Ilya Mandel
Monthly Notices of the Royal Astronomical Society, Volume 499, Issue 1, pp.1154-1171 (2020)

[6] **Comprehensive study of ejecta-companion interaction for core-collapse supernovae in massive binaries**
Ryosuke Hirai, Philipp Podsiadlowski, Shoichi Yamada
The Astrophysical Journal, Volume 864, Issue 2, article id. 119, 17 pp. (2018)

[5] **The Origin of the Possible Massive Black Hole in the Progenitor System of iPTF13bvn**
Ryosuke Hirai
Monthly Notices of the Royal Astronomical Society: Letters, Volume 469, Issue 1, p.L94-L98 (2017)

[4] **Formation Scenario of the Progenitor of iPTF13bvn Revisited**
Ryosuke Hirai
Monthly Notices of the Royal Astronomical Society, Volume 466, Issue 4, p.3775-3783 (2017)

[3] **Hyperbolic Self-Gravity Solver for Large Scale Hydrodynamical Simulations**
Ryosuke Hirai, Hiroki Nagakura, Hirotada Okawa, Kotaro Fujisawa
Physical Review D, Volume 93, Issue 8, article id.083006 (2016)

[2] **Possible Signatures of Ejecta-Companion Interaction in iPTF 13bvn**
Ryosuke Hirai, Shoichi Yamada
The Astrophysical Journal, Volume 805, Issue 2, article id. 170, 7 pp. (2015)

[1] **The Outcome of Supernovae in Massive Binaries; Removed Mass, and its Separation Dependence**
Ryosuke Hirai, Hidetomo Sawai, Shoichi Yamada
The Astrophysical Journal, Volume 792, Issue 1, article id. 66, 15 pp. (2014)

Co-Author

[11] **Stellar Core-Merger-Induced Collapse: New Formation Pathways for Black Holes, Thorne-Żytkow objects, Magnetars and Superluminous Supernovae**
Iminhaji Ablimit, Philipp Podsiadlowski, Ryosuke Hirai, James Wicker
submitted

[10] **Supernova explosions in active galactic nuclear discs**
Evgeni Grishin, Alexey Bobrick, Ryosuke Hirai, Ilya Mandel, Hagai B. Perets
Monthly Notices of the Royal Astronomical Society, Volume 507, Issue 1, pp.156-174 (2021)

[9] **The observability of inflated companion stars after supernovae in massive binaries**
Misa Ogata, Ryosuke Hirai, Kotaro Hijikawa
Monthly Notices of the Royal Astronomical Society, Volume 505, Issue 2, pp.2485-2499 (2021)

[8] **Wind Mass-loss Rates of Stripped Stars Inferred from Cygnus X-1**
Coenraad J. Neijssel, Serena Vinciguerra, Alejandro Vigna-Gómez, Ryosuke Hirai, James C. A. Miller-Jones, Arash Bahramian, Thomas J. Maccarone, Ilya Mandel
The Astrophysical Journal, Volume 908, Issue 2, id.118, 9 pp. (2021)

[7] **Neutron Star Extreme Matter Observatory: A kilohertz-band gravitational-wave detector in the global network**
Ackley et al. (including Ryosuke Hirai)
Publications of the Astronomical Society of Australia, Volume 37, article id. e047 (2020)

[6] **The sensitivity of presupernova neutrinos to stellar evolution models**
Chinami Kato, Ryosuke Hirai, Hiroki Nagakura
Monthly Notices of the Royal Astronomical Society, Volume 496, Issue 3, pp.3961-3972 (2020)

[5] **A Subsolar Metallicity Progenitor for Cassiopeia A, the Remnant of a Type IIb Supernova**
Toshiki Sato, Takashi Yoshida, Hideyuki Umeda, Shigehiro Nagataki, Masaomi Ono, Keiichi Maeda, Ryosuke Hirai, John P. Hughes, Brian J. Williams, Yoshitomo Maeda
The Astrophysical Journal, Volume 893, Issue 1, id.49, 9 pp. (2020)

[4] **Origins of Type Ibn SNe 2006jc/2015G in interacting binaries and implications for pre-SN eruptions**
Ning-Chen Sun, Jusytn R. Maund, Ryosuke Hirai, Paul A. Crowther, Philipp Podsiadlowski
Monthly Notices of the Royal Astronomical Society, Volume 491, Issue 4, p.6000-6019 (2020)

[3] **Hydrodynamical simulations and similarity relations for eruptive mass loss from massive stars**
Stanley P. Owocki, Ryosuke Hirai, Philipp Podsiadlowski, Fabian R. N. Schneider
Monthly Notices of the Royal Astronomical Society, Volume 485, Issue 1, p.988-1000 (2019)

[2] **The W4 method: a new multi-dimensional root-finding scheme for nonlinear systems of equations**
Hirotada Okawa, Kotaro Fujisawa, Yu Yamamoto, Ryosuke Hirai, Nobutoshi Yasutake, Hiroki Nagakura, Shoichi Yamada
arXiv:1809.04495

[1] **Formation pathway of Population III coalescing binary black holes through stable mass transfer**
Kohei Inayoshi, Ryosuke Hirai, Tomoya Kinugawa, Kenta Hotokezaka
Monthly Notices of the Royal Astronomical Society, Volume 468, Issue 4, p.5020-5032 (2017)

Other Articles

[1] 水素欠乏超新星の親星の起源**(The Origin of the Progenitors of Stripped-Envelope Supernovae)**
平井 遼介 (Ryosuke Hirai)
天文月報*(The Astronomical Herald)*, Volume 111, Issue 9, p.580-588 (2018)