

NICHOLAS Z. RUI

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EDUCATION

- Ph.D. Physics** (in progress) 2020 —
California Institute of Technology — Division of Physics, Mathematics, and Astronomy
NSF Graduate Research Fellow
Pasadena, CA
- B.A. Physics, Astrophysics** 2016 – 2020
University of California, Berkeley — College of Letters and Science
Highest Distinction
Berkeley, CA

RESEARCH

- Red giant asteroseismology** ([site](#)) 2020 —
Advisor: Jim Fuller ◊ *Caltech Department of Physics (TAPIR)*
- Globular cluster dynamics** ([site](#)) 2019
Advisor: Fred Rasio ◊ Mentor: Kyle Kremer ◊ *NU Department of Physics and Astronomy (CIERA)*
- Nanoscale sensing with solid-state defects** ([site](#)) 2018 – 2020
Advisor: Norman Yao ◊ Mentor: Satcher Hsieh ◊ *UCB Department of Physics*
- Young massive clusters in the Galactic Center** ([site](#)) 2016 – 2019
Advisor: Jessica Lu ◊ Mentor: Matthew Hosek Jr. ◊ *UCB Department of Astronomy*

REFEREED PUBLICATIONS

[Google Scholar](#) ◊ [Astrophysics Data System](#) ◊ [arXiv](#) ◊  0000-0002-1884-3992

[9] *Compact Object Modeling in the Globular Cluster 47 Tucanae*

Ye, C. S.; Kremer, K.; Rodriguez, C. L.; **Rui, N. Z.**; Weatherford, N. C.; Chatterjee, S.; Fragione, G.; Rasio, F. A.
submitted to *Astrophys. J.* [arXiv:2110.05495](#)

[8] *Modeling Dense Star Clusters in the Milky Way and Beyond with the Cluster Monte Carlo Code*

Rodriguez, C. L.; Weatherford, N. C.; Coughlin, S. C.; Amaro-Seoane, P.; Breivik, K.; Chatterjee, S.; Kiroğlu, F.; Kremer, K.; **Rui, N. Z.**;
Ye, C. S.; Zevin, M.; Rasio, F. A.
accepted to *Astrophys. J., Suppl. Ser.* [arXiv:2106.02643](#)

[7] *Asteroseismic fingerprints of stellar mergers*

Rui, N. Z.; Fuller, J.
Mon. Notices Royal Astron. Soc. *508*, 2 (2021). [arXiv:2108.10322](#)

[6] *White Dwarf Subsystems in Core-Collapsed Globular Clusters*

Kremer, K.; **Rui, N. Z.**; Weatherford, N. C.; Chatterjee, S.; Fragione, G.; Rasio, F. A.; Rodriguez, Carl L.; Ye, Claire S.
Astrophys. J. *917*, 28 (2021). [arXiv:2104.11751](#)

[5] *Matching Globular Cluster Models to Observations*

Rui, N. Z.; Kremer, K.; Weatherford, N. C.; Chatterjee, S.; Rasio, F. A.; Rodriguez, Carl L.; Ye, Claire S.
Astrophys. J. *912*, 102 (2021). [arXiv:2103.05033](#)

[4] *Modeling Dense Star Clusters in the Milky Way and Beyond with the CMC Cluster Catalog*

Kremer, K.; Ye, C. S.; **Rui, N. Z.**; Weatherford N. C.; Chatterjee, S.; Fragione, G.; Rodriguez, C. L.; Spera, M.; Rasio, F. A.
Astrophys. J., Suppl. Ser. *274*, 48 (2020). [arXiv:1911.00018](#)

[3] *Imaging stress and magnetism at high pressures using a nanoscale quantum sensor*

Hsieh, S.; Bhattacharyya, P.; Zu, C.; Mittiga, T.; Smart, T. J.; Machado, F.; Kobrin, B.; Höhn, T. O.; **Rui, N. Z.**; Kamrani, M.; Chatterjee,

S.; Choi, S.; Zaletel, M.; Struzhkin, V. V.; Moore, J. E.; Levitas, V. I.; Jeanloz, R.; Yao, N. Y. *Science* 366, 6471 (2019). [arXiv:1812.08796](#)

[2] *The Quintuplet Cluster: Extended Structure and Tidal Radius*

Rui, N. Z.; Hosek Jr., M. W.; Lu, J. R.; Clarkson, W. I.; Anderson, J.; Morris, M. R.; Ghez, A. M. *Astrophys. J.* 877, 37 (2019). [arXiv:1904.02395](#)

[1] *Imaging the local charge environment of nitrogen-vacancy centers in diamond*

Mittiga, T.; Hsieh, S.; Zu, C.; Kobrin, B.; Machado, F.; Bhattacharyya, P.; **Rui, N. Z.**; Jarmola, A.; Choi, S.; Budker, D.; Yao, N. Y. *Phys. Rev. Lett.* 121, 24 (2018). [arXiv:1809.01668](#)

OTHER PUBLICATIONS

[3] *No Black Holes in NGC 6397*

Rui, N. Z.; Weatherford, N. C.; Kremer, K.; Chatterjee, S.; Fragione, G.; Rasio, F. A.; Rodriguez, Carl L.; Ye, Claire S. *Res. Notes AAS.* 5, 47 (2021). [arXiv:2103.06273](#)

[2] *Prioritizing Well-Being: Berkeley Chapter Focuses on Health, Inclusion, and Community*

Rui, N.; Kim, Y.

The SPS Observer, LIII, 4 (2020).

[1] *The Stellar Initial Mass Function Across Different Environments*

Hosek Jr., M. W.; Lu, J. R.; Andersen, M.; Do, T.; Kim, D.; **Rui, N. Z.**; Boyle, P.; Williams, B. F.; Chakrabarti, S.; Beaton, R. L. *Astro2020 White Paper* (2019). [arXiv:1903.05107](#)

TEACHING

Caltech Y ([site](#))

- Volunteer tutor for mathematics and science for students from middle school to undergraduate level

Democratic Education at Cal ([site](#))

- Spring 2020 – Astronomy 98: *Beginner's Guide to the Universe* ([site](#))
(with *Shashank Dholakia, Shishir Dholakia, Yonna Kim*; faculty sponsor: *Jessica Lu*)
- Fall 2019 – Astronomy 98: *Beginner's Guide to the Universe* ([site](#))
(with *Shashank Dholakia, Shishir Dholakia*; faculty sponsor: *Jessica Lu*)
- Spring 2019 – Astronomy 98, 198: *Python for Astronomers* ([site](#))
(with *Orion Lyau, Alexander Ye*; faculty sponsor: *Daniel Weisz*)
- Spring 2018 – Astronomy 98, 198: *Python for Astronomers*
(with *Makena Fetzer, Orion Lyau*; faculty sponsor: *Mariska Kriek*)

Course Reader

- Spring 2020 – Physics/Astronomy C202: *Astrophysical Fluid Dynamics* (instructor: *Eugene Chiang*)
- Fall 2018 – Physics 110A: *Electromagnetism and Optics* (instructor: *Kam-Biu Luk*)

AWARDS

National Science Foundation Graduate Research Fellowship (2021-2025)
Dominic Orr Graduate Fellowship (2020-2021)
Department Citation, UCB Department of Astronomy (2020)
Bernard Fries Memorial Award (2019-2020)
Illinois Space Grant (2019)
Dean's List (2016-2019)
Isidore Pomerantz Endowment Award (2018-2019)
Berkeley Physics Undergraduate Research Scholar (2018)
National Merit Scholarship Finalist (2016)

SERVICE AND OUTREACH

Outreach Talks

- *Some Scientific Stories*. Physics Unlimited Summer Camp, Zoom, August 2020.
- *Star Clusters: Many-Body Laboratories*. Marin Science Seminar (Terra Linda High School), Berkeley, CA, November 2019.
- *Globular Clusters: Many-Body Laboratories*. What's Up! Astronomy Talks @Claremont (Claremont Branch Library), Berkeley, CA, November 2019.
- *50th Anniversary of the Apollo 11 Moon Landing*. CIERA Astronomer Evenings (Dearborn Observatory, Northwestern University), Evanston, IL, July 2019.

Learning Unlimited – Rainstorm ([site](#))

- Winter 2021 – S822: *Apples to Orbits* (with Sarah Habib, Isaac Legred)
- Spring 2021 – X665: *The Art of Guessing* (with Erika Hathaway, Yonna Kim)

Learning Unlimited – Splash at Berkeley ([site](#))

- Spring 2019 – M507: *Mostly Complex*
- Fall 2018 – S391: *Why Quantum?* (with Arani Acharya)
- Fall 2018 – S392: *Spacetime* (with Arani Acharya)

Committee Appointments

- Undergraduate Student Services Committee, *UCB Department of Astronomy* (2019)
- Major Curriculum Committee, *UCB Department of Physics* (2018 – 2020)

Society of Physics Students at Berkeley ([site](#))

- 2019-2020: President
- 2018-2019: Co-vice president (with Richard Pan)
- 2017-2018: Outreach coordinator