

# Ryan Low

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## SUMMARY

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Ryan Low is an Astrophysics Theory PhD. His research interests lie at the intersection of structure formation, phenomenological modeling, and advanced machine learning methods.

## POSITIONS

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### PhD Student

Aug 2020 - Present

Using hydrodynamical cosmological simulations, can we use novel methods to detect and constrain generic self-interacting dark matter models? Performing these simulations requires high performance computing. Analysis involves handling big data with both C/C++ and Python. Major projects include studying how modified dark matter physics affects small scale structure formation and how to connect simulation results to observation beyond summary statistics.

### Teaching Assistant

Aug 2020 - Present

– Quantum Mechanics I

2020

– Mechanics Laboratory

2020 - 2022

– Optics Laboratory

2022 - 2024

– Graduate Problem Solving

2024 - Present

## EDUCATION

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2020 - present PhD Physics at **University of Kansas** (Expected Defense: May 2026) (GPA: 4.0/4.0)

2016 - 2020 B. Sc. Physics at **University of California, San Diego** (GPA: 3.8/4.0, Cum Laude)

## PUBLICATIONS

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**Low, Ryan**, Adhikari, Rakshak, Rose, Jonah C., O’Neil, Stephanie, et al. Mar. 2025. “Structure Formation under Inelastic Two-Component Dark Matter: Halo Statistics and Matter Power Spectra in the High- $z$  Universe”. In: *arXiv e-prints*, arXiv:2503.05881, arXiv:2503.05881. DOI: [10.48550/arXiv.2503.05881](https://doi.org/10.48550/arXiv.2503.05881). arXiv: [2503.05881](https://arxiv.org/abs/2503.05881) [[astro-ph.CO](#)].

Rose, Jonah C., Torrey, Paul, Villaescusa-Navarro, Francisco, Lisanti, Mariangela, [...], **Low, Ryan**, et al. Apr. 2025. “Introducing the DREAMS Project: DaRk mattEr and Astrophysics with Machine Learning and Simulations”. In: *ApJ* 982.2, 68, p. 68. DOI: [10.3847/1538-4357/adb8e5](https://doi.org/10.3847/1538-4357/adb8e5). arXiv: [2405.00766](https://arxiv.org/abs/2405.00766) [[astro-ph.GA](#)].

Kirkpatrick, J. Davy, Marocco, Federico, Gelino, Christopher R., Raghu, Yadukrishna, [...], **Low, Ryan**, et al. Apr. 2024. “The Initial Mass Function Based on the Full-sky 20 pc Census of  $\sim 3600$  Stars and Brown Dwarfs”. In: *ApJS* 271.2, 55, p. 55. DOI: [10.3847/1538-4365/ad24e2](https://doi.org/10.3847/1538-4365/ad24e2). arXiv: [2312.03639](https://arxiv.org/abs/2312.03639) [[astro-ph.SR](#)].

Rose, Jonah C., Torrey, Paul, Villaescusa-Navarro, Francisco, Vogelsberger, Mark, [...], **Low, Ryan**, et al. Jan. 2024. “Inferring warm dark matter masses with deep learning”. In: *MNRAS* 527.1, pp. 739–755. DOI: [10.1093/mnras/stad3260](https://doi.org/10.1093/mnras/stad3260). arXiv: [2304.14432](https://arxiv.org/abs/2304.14432) [[astro-ph.CO](#)].

O’Neil, Stephanie, Vogelsberger, Mark, Heeba, Saniya, Schutz, Katelin, [...], **Low, Ryan**, et al. Sept. 2023. “Endothermic self-interacting dark matter in Milky Way-like dark matter haloes”. In: *MNRAS* 524.1, pp. 288–306. DOI: [10.1093/mnras/stad1850](https://doi.org/10.1093/mnras/stad1850). arXiv: [2210.16328](https://arxiv.org/abs/2210.16328) [[astro-ph.GA](#)].

**Low, Ryan**, Burgasser, Adam J., Reylé, Céline, Gerasimov, Roman, Hsu, Chih-Chun, and Theissen, Christopher A. Feb. 2021. “Spectroscopic Confirmation of an M6 Dwarf Companion to the Nearby Star BD-08 2582”. In: *Research Notes of the American Astronomical Society* 5.2, 26, p. 26. DOI: [10.3847/2515-5172/abe470](https://doi.org/10.3847/2515-5172/abe470).

## PRESENTATIONS

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**Low, Ryan**, Adhikari, Rakshak, Medvedev, Mikhail, Vogelsberger, Mark, et al. Apr. 2022. “Lyman-alpha forest studies of cosmological simulations with inelastic two-component dark matter (2cDM)”. In: *APS April Meeting Abstracts*. Vol. 2022. APS Meeting Abstracts, S17.051, S17.051.

**Low, Ryan**, Adhikari, Rakshak, Medvedev, Mikhail, O’Neil, Stephanie, et al. Apr. 2023. “Numerical studies of inelastic dark matter cosmology”. In: *APS April Meeting Abstracts*. Vol. 2023. APS Meeting Abstracts, P01.004, P01.004.

**Low, Ryan**, Adhikari, Rakshak, Medvedev, Mikhail, Vogelsberger, Mark, et al. Apr. 2024. “Effect of inelastic dark matter on Lyman-alpha forest”. In: *APS April Meeting Abstracts*. Vol. 2024. APS Meeting Abstracts, T12.007, T12.007.

**Low, Ryan**, Adhikari, Rakshak, Medvedev, Mikhail, Vogelsberger, Mark, et al. Mar. 2025. “Effects of Inelastic Two-Component Dark Matter in Subhalo Formation and Composition”. In: *APS Global Physics Summit Abstracts*. Vol. 2025. APS Meeting Abstracts, R21.005, R21.005.

**Low, Ryan** and Medvedev, Mikhail. Nov. 2025. “Eigenmodes in an ultrarelativistic pair QED-plasma”. In: *APS DPP Meeting Abstracts*. Vol. 2025. APS Meeting Abstracts, BP13.038, BP13.038.

## PROFESSIONAL MEMBERSHIP

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2020 - present American Physical Society

DAP, DCOMP

## SKILLS

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Python	9+ yrs
C/C++	9+ yrs
Linux	9+ yrs
Java	8+ yrs
Mathematica	7+ yrs
HPC/slurm	5+ yrs
PYTORCH	3+ yrs

## SKILLS

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Redeker Scholarship 2024

E. E. Slossen Award 2022 - 2023