# Sum(Mahdi) Qezlou

*Curriculum Vitae*

*Department of Physics and Astronomy*
*University of California, Riverside*
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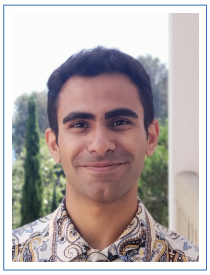
*Webpage*
*Github*



## Education

2018–present **PhD, Physcis & Astronomy**, *University of California, Riverside*.
Applications of 3D Lyman-$\alpha$ forest tomography. Computational Astrophysics

Advisors : Simeon Bird, UCR. Andrew Newman, Carnegie Observatories. Gwen Rudie, Carnegie Observatories.

2013-2018 : **B.Sc in Physics** , *Sharif University of Technology, SUT*.

Research Advisor : Shant Baghram, SUT

## Publications

### Journal Articles

2023 **Mahdi Qezlou**, Simeon Bird, Adam Lidz, Guochao Sun, Andrew B. Newman, Gwen C. Rudie, Yueying Ni, Rupert Croft, and Tiziana Di Matteo. Boosting Line Intensity Map Signal-to-Noise with the Ly-$\alpha$ Forest Cross-Correlation. *arXiv e-prints*, page arXiv:2303.17632, March 2023.

2023 Simeon Bird, Martin Fernandez, Ming-Feng Ho, **Mahdi Qezlou**, Reza Monadi, Yueying Ni, Nianyi Chen, Rupert Croft, and Tiziana Di Matteo. PRIYA: A New Suite of Lyman-alpha Forest Simulations for Cosmology. *arXiv e-prints*, page arXiv:2306.05471, June 2023.

2022 **Mahdi Qezlou**, Andrew B. Newman, Gwen C. Rudie, and Simeon Bird. Characterizing Protoclusters and Protogroups at z 2.5 Using Ly$\alpha$ Tomography. , volume 930, page 109, May 2022.

2022 Andrew B. Newman, Gwen C. Rudie, Guillermo A. Blanc, **Mahdi Qezlou**, Simeon Bird, Daniel D. Kelson, Victoria Pérez, Enrico Congiu, Brian C. Lemaux, Alan Dressler, and John S. Mulchaey. A population of ultraviolet-dim protoclusters detected in absorption. , volume 606, pages 475–478, June 2022.

2022 Taro Matsuo, Thomas P. Greene, **Mahdi Qezlou**, Simeon Bird, Kiyotomo Ichiki, Yuka Fujii, and Tomoyasu Yamamuro. Densified Pupil Spectrograph as High-precision Radial Velocimetry: From Direct Measurement of the Universe's Expansion History to Characterization of Nearby Habitable Planet Candidates. , volume 163, page 63, February 2022.

## Research Experience:

### Keywords:

**Running Cosmological hydrodynamic simulations (`MP_GADGET`), $Ly-\alpha$ tomography at cosmic noon, Machine Learning & Bayesian statistics**.

### at UCR and Carnegie Observatories

Jun2023 – present ***Line-intensity emulators for upcoming COMAP/EXCLAIM experiments***, `PRIYA` collaboration.
Emulating the 3D power spectrum of the CO/[CII] emission observed with the upcoming line-intensity surveys using the cosmological hydro simulations *Publication :* Qezlou et. al. in prep

Jun2023 – present ***Constraining cosmology with high-resolution Ly-$\alpha$ forest simulations and observations*** , `PRIYA` collaboration..
Building an emulator for the high-resolution spectroscopic observations of the Ly-$\alpha$ forest using high-resolution hydrodynamical simulations *Publication :* Qezlou et. al. in prep

Jan,2022 – 2023 ***Boosting Line Intensity Map Signal-to-Noise with the Ly-$\alpha$ Forest Cross-Correlation***, Ly-$\alpha$ tomography IMACS Survey (LATIS) collaboration..
Enhancing the S/N of molecular line intensity detection by joining the power with 3D Ly-$\alpha$ absorption tomographies. Cosmology, Galaxy formation at cosmic noon *Publication :* Qezlou et. al. 2023

Jan,2020 – Dec,2021 ***Characterizing galaxy protoclusters and protogroups in 3D Ly-$\alpha$ tomography surveys.***, Ly-$\alpha$ tomography IMACS Survey (LATIS) collaboration.
Image processing techniques helping detect progenitors of massive galaxies at $z \sim 2.5$ in 3D Lyman-$\alpha$ absorption tomography. *Publication :* Qezlou et. al. 2021

2018 – present ***Scaling the post-processing tools for extremely large hydrodynamical simulations***.
Collaborating with *Simeon Bird* on fake_spectra project. *Publication :* Qezlou et. al. 2021

## Fellowships & Awards

2022-2023 ***Dissertation-Year Fellowship***, Awarded to only 3 students at UCR among all PhD majors.

2020 – 2021 ***Carnegie-UCR Fellowship*** Graduate researcher fellow at Carnegie observatories to work on Ly$\alpha$ tomography IMACS survey (LATIS) project.

2018-2019 ***UCR Graduate Dean Fellowship***, for Fall, spring and Summer quarters

## Computing skills

Computational Machine learning, Bayesian Statistics

Programming Python, C, MPI parallel computing, High-performance computing

Visualization Virtual Reality engines, e.g. *Blender* and *Unity*, YouTube Channel

## Mentorship Experience

Fall-Winter 2022-23 **High-school science fair project, student: Joseph Zenarosa (Martin Luther King High, Riverside)**, Reionization in `ASTRID` , a cosmological hydrodynamic simulation.
Mentoring the student for science fair competition

summer 2022 **Undergraduate summer project, student: Kevin Hong (UCLA)**, *3D Visualization of cosmological hydrodynamical simulations*.
Mentoring student, visualizations using `Blender` open-source software

summer 2021 and 2022 and 2023 **CASSI, Summer research program for undergraduates at Carnegie observatory,** , *Teaching python, high-performance computing, and scientific visualizations to $\sim$ 20 students each year*.

## Talks

February 2023 Presenting Tutorial on Machine Learning approaches in large-scale galaxy formation simulations
KITP Program, Data Driven Astronomy

December 2023 Boosting Line Intensity Map Signal-to-Noise with the Ly-$\alpha$ Forest Cross-Correlation
Flatiron Institute, Cosmology and Astrophysics with Machine Leaning Simulations(CAMELS) workshop

October 2022 Characterizing Protoclusters and Protogroups at z $\sim$ 2.5 Using Ly-$\alpha$ Tomography
IPAC Talk Series

Jun 2022 Characterizing Protoclusters and Protogroups at z $\sim$ 2.5 Using Ly-$\alpha$ Tomography
Cosmology from home conference

September 2022 Characterizing Protoclusters and Protogroups at z $\sim$ 2.5 Using Ly-$\alpha$ Tomography
Protoclusters: galaxies in confinement

## Professional service

Referee for high-impact journals: **ApJ Letters** **Physical Review D**

Review panelist : **Gemini telescope** Canadian time allocation committee (CanTAC)

## Teaching Assistantship

2018 : **Physics lab I**, UCR.

2017-18 : **Quantum mechanics I & II**, SUT.

2016 : **Special relativity**, SUT.