Dhruv Muley

September 2021

dmuley@berkeley.edu
+1 (*510*) *579-9337*
dmuley.github.io
Citizenship*: United States*

Education and Appointments

PhD Astrophysics, Max Planck Institute for Astronomy, Heidelberg (Germany) 2021—
Advisor: Prof. dr. Hubert Klahr
Research Interests numerical hydrodynamics, radiative transfer, exoplanets/protoplanetary disks

Numerical hydrodynamics simulations of protoplanetary disks.

Research Assistant, University of Victoria (British Columbia) 2020–21
Advisor: Prof. Ruobing Dong
Research Interests numerical hydrodynamics, radiative transfer, exoplanets/protoplanetary disks

Running 3D hydrodynamical simulations of protoplanetary disks with PEnGUIn and post-processing them with the HOCHUNK3D radiative-transfer code, to better understand how planet-induced spiral density waves impact disk temperature structure.

B.A. Physics, B.A. Astrophysics, University of California, Berkeley 2016–20
GPA: *3.861/4.000 (major) · 3.845/4.000 (overall) · High Distinction*
Research Interests numerical hydrodynamics, exoplanets/protoplanetary disks, galaxy evolution

Publications

5. **Muley, Dhruv**; Wheeler, Coral; Hopkins, Philip; Wetzel, Andrew; Emerick, Andrew; Kereš, Dušan. "Progenitor-mass-dependent yields amplify intrinsic scatter in dwarf-galaxy elemental abundance ratios," *Monthly Notices of the Royal Astronomical Society* (2021; accepted, ArXiv:2008.04901)

4. **Muley, Dhruv**; Dong, Ruobing; Fung, Jeffrey. "Observational signatures of planets in protoplanetary disks: Temperature structures in spiral arms," *The Astronomical Journal*, 162, 4 (2021; ArXiv:2107.06323)

3. van der Marel, Nienke and 9 others incl. **Dhruv Muley**. "On the diversity of asymmetries in gapped protoplanetary disks," *The Astronomical Journal*, 161, 33 (2021; arXiv:2010.10568)

2. Fung, Jeffrey; **Muley, Dhruv**. "A staggered semi-analytic method for simulating dust grains subject to gas drag," *The Astrophysical Journal Supplement Series*, 244, 2 (2019; ArXiv:1909.02006)

1. **Muley, Dhruv**; Fung, Jeffrey; van der Marel, Nienke. "PDS 70: A transition disk sculpted by a single planet," *The Astrophysical Journal Letters*, 879, 1 (2019; ArXiv:1902.07191)

Talks and Conferences

4. "Observational signatures of planet formation: temperature structures from spiral arms" May 8, 2021
Poster at CASCA 2021 AGM

3. "Wide, deep cavities in gas and dust: simulations versus observations" December 7-11, 2020
Oral talk (main presenter) at Five years after HL Tau: a new era in planet formation (virtual)

2. "PDS 70: A laboratory for disk-planet interaction" November 22, 2019
Oral talk (main presenter) at Bay Area Planetary Science Meeting (Stanford)

1. "PDS 70: A transition disk sculpted by a single planet" February 14, 2019
Oral talk (main presenter) at Astronomy Thursday Lunch (UC Berkeley)

Temporary Appointments

Undergraduate Researcher, University of California, Berkeley 2020
Advisor: Dr. Sivan Ginzburg
Developed scaling relations for planetary gap depths and migration rates.

SURF Fellow, California Institute of Technology 2019-20
Advisor: Dr. Coral Wheeler, Prof. Philip F. Hopkins
As part of a Caltech summer project in 2019 (for which the fellowship amount was $6350), implemented progenitor-dependent yields and event rates for supernovae and stellar winds, from the NuGrid suite, into the GIZMO hydrodynamics code. Subsequently ran simulations to measure the resulting changes in metal abundances in dwarf galaxies, resulting in a publication.

Undergraduate Researcher, University of California, Berkeley 2018–19
Advisor: Dr. Jeffrey Fung
Studied the morphology of the PDS 70 transition disk with the GPU-hydrodynamics code PEnGUIn. Subsequently, helped devise an improved method for integrating the trajectories of dust grains (e.g., in disks) subject to gas drag.

Affiliate, Lawrence Berkeley National Laboratory 2017–18
Advisor: Dr. Carlton Pennypacker

Undergraduate Researcher, Columbia University (remote) 2016
Advisor: Prof. David Kipping

Technical Skills

Advanced	Python, C/C++, Unix
Intermediate	CUDA, Java, Mathematica, LaTeX
Basic	Fortran 90, HTML, JavaScript, Photoshop, MPI

Teaching

Undergraduate Student Instructor, Physics 5BL, University of California, Berkeley 2020
Instructor: Dr. Gurpreet Kaur
Helped students conduct experiments and graded lab reports for 25 students in Physics 5BL, Berkeley's laboratory course for first-year physics majors focusing on springs and waves.

Reader, Physics 137B, University of California, Berkeley 2019
Instructor: Prof. Michael Crommie
Graded roughly 60 homework assignments biweekly for Physics 137B, the second semester of upper division quantum mechanics at Berkeley, during Spring 2019.

Undergraduate Student Instructor, Astronomy C10, University of California, Berkeley 2018
Instructor: Prof. Alex Filippenko
Ran weekly discussion sections, devised worksheets and study materials, and graded exams for approximately 60 students in Astronomy C10, UC Berkeley's survey course on astronomy for non-majors, during the Fall 2018 semester.

Reader, Astronomy C10, University of California, Berkeley 2017
Instructor: Prof. Alex Filippenko
Graded roughly 100 homework assignments per week for Astronomy C10.

Outreach

Mentor, SPLASH, University of California, Berkeley 2020

Gave an "Introduction to Theoretical Astrophysics" seminar class to high-school students in the San Francisco Bay Area, emphasizing order-of-magnitude reasoning skills.

Member, Undergraduate Astrophysics Service Committee, University of California, Berkeley 2019—
Advisor: Amber Banayat, Prof. Mariska Kriek
Helped improve recruitment and retention of astrophysics majors.

Mentor, Be a Scientist program, Martin Luther King Jr. Middle School, Berkeley 2018
Advisor: Darlene Yan
Worked with students in Berkeley aged 11-14 to develop scientifically testable hypotheses, devise and conduct experiments, and analyze results.

Languages

English Fluent; professional working proficiency
Spanish Professional working proficiency
Marathi Basic