

DHRUV MULEY

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Citizenship: United States

EDUCATION AND APPOINTMENTS

Research Assistant, University of Victoria

2020—

Advisor: Prof. Ruobing Dong

Research Interests numerical hydrodynamics, radiative transfer, exoplanets/protoplanetary disks

Running hydrodynamical simulations of protoplanetary disks and post-processing them with radiative-transfer codes, to better understand how planet-induced spiral density waves would appear in scattered-light observations.

B.A. Physics, B.A. Astrophysics, University of California, Berkeley

2016–20

Major GPA: 3.861/4.000 · Overall GPA: 3.845/4.000 · *High Distinction*

Research Interests numerical hydrodynamics, exoplanets/protoplanetary disks, galaxy evolution

Relevant Coursework

Undergrad-level: Statistical and Thermal Physics, Quantum Mechanics I-II, Classical Mechanics, Mathematical Methods in Physics, Stellar Physics
Radio Astronomy Laboratory

Grad-level: General Relativity, Radiative Processes in Astrophysics, Classical Electrodynamics, Geophysical and Astrophysical Fluid Dynamics, Galaxies

PUBLICATIONS

1. **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* (2020; submitted, ArXiv:2008.04901)
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)
3. **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)

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 Advisor: Dr. Jeffrey Fung Studied the morphology of the PDS 70 transition disk with the GPU-hydrodynamics code PEnGUI. Subsequently, helped devise an improved method for integrating the trajectories of dust grains (e.g., in disks) subject to gas drag.	2018–19
Affiliate , Lawrence Berkeley National Laboratory Advisor: Dr. Carlton Pennypacker	2017–18
Undergraduate Researcher , Columbia University (remote) Advisor: Prof. David Kipping	2016

TECHNICAL SKILLS

Advanced	Python, C/C++, Unix
Intermediate	CUDA, Java, Mathematica, L ^A T _E X
Basic	HTML, JavaScript, Photoshop, MPI

TALKS AND CONFERENCES

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| 1. “PDS 70: A laboratory for disk-planet interaction”
Oral talk (main presenter) at Bay Area Planetary Science Meeting (Stanford) | November 22, 2019 |
| 2. Discussion leader at ExoCoffeeTea exoplanet journal club (UC Berkeley) | September 25, 2019 |
| 3. “PDS 70: A transition disk sculpted by a single planet”
Oral talk (main presenter) at Astronomy Thursday Lunch (UC Berkeley) | February 14, 2019 |

TEACHING

Undergraduate Student Instructor , Physics 5BL, University of California, Berkeley 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.	2019
Reader , Physics 137B, University of California, Berkeley 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.	2019
Undergraduate Student Instructor , Astronomy C10, University of California, Berkeley 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.	2018
Reader , Astronomy C10, University of California, Berkeley Instructor: Prof. Alex Filippenko	2017

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