ARELI CASTREJON

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EDUCATION

California State University, Northridge *2017 - 2019*
Master's of Science in Physics
GPA: 3.50

California State University, Northridge *2015 - 2017*
Bachelor's of Science in Physics - Astrophysics Option

Pasadena City College *2010 - 2015*
Transfer Coursework in Physics

EXPERIENCE

Research Assistant August 2019 - Present
NASA/Jet Propulsion Laboratory-Caltech

· We began a project involving the chemistry in vortices that are present in circumstellar disks. We plan to investigate the concetration of grains of different sizes, dust/gass mass ratios, and the amount of time the dust survives in the disk. We probe into the question whether streaming instabilities can be overcome, allowing for planetesimal formation via self-gravity.

Graduate Research Assistant August 2017 - August 2019
California State University, Northridge

· Started a new project on debris disks where we studied the role of dust-to-gas ratios on planet-induced gaps in the gas of the disk. We found that disks starting with higher dust-to-gas ratios, reach local dust-to-gas ratios of 1. This causes the shape of the gap to deviate as the dust begins to affect the gas motion. We also studied the effect of dust drift, which should be present in debris disks. Wed found that the drift was also causing large concentrations of dust to accumulate at the edges of the planetary gap, leading to local dust-to-gas ratios near unity.

Undergraduate Researcher October 2016 - August 2017
California State University, Northridge

· During this time we studied debris disks with photoelectric heating, a proposed mechanism that could explain structures in these disks usually attributed to planets. Our aim was to disentagle the effect of this instability from the effects of a planetary perturber. We studied disks containing a solitary planet using a Neptune or Jupiter-sized analog. We found that in order to differentiate the effects of a planet from the instability, a plantet must carve a dust gap that is larger than the periodicity of the instability structures. We also studied various disk temperatures and found that larger temperatures increase dust drift, quenching the effects of the instability, as well as reducing the gap carved by the planet.

Peer Learning Facilitator January 2017 - June 2017
California State University, Northridge

· In this position, the Facilitator was tasked with holding two lectures a week, of 1.5 hour length. The Facilitator would be in charge of bringing in their own problems and lecture to supplement the main instruction. The Facilitator would also be in charge of holding two 1-hour sessions where they would answer any questions regarding homework or exam preparation.

AWARDS

Pasadena City College Recognition in Astronomy *2015*
MESA of PCC Certificate of Recognition *2015*

TALKS AND PUBLICATIONS

Astrophysical Letter Publication In Preparation
Carbon ionization heating does not quench the photoelectric instability in debris disks

Astrophysical Journal Publication Submitted 2019
Disentangling planets from photoelectric instability in gas-rich optically thin dusty disks *Accepted*

10-min Talk at Research Symposium April 2019
California State University, Northridge

Speaker at Journal Club April 2019
NASA Goddard Space Flight Center

Speaker at Journal Club April 2019
Jet Propulsion Laboratory (NASA-Caltech)

Speaker at Max Planck Institute for Astronomy August 2018
Heidelberg, Germany

10-min Talk at Research Symposium April 2018
California State University, Northridge

Poster at Exoplanets in Southern California September 2017
Caltech

Speaker at NORDITA: Phase Transitions in Astrophysics May 2017
Stockholm, Sweden

Chosen Representative at CSU Research Competition April 2017
Cal. Poly. San Luis Obispo

Poster at Research Symposium April 2017
California State University, Northridge

TECHNICAL AND PERSONAL SKILLS

Programming Languages	Proficient: Python & MATLAB (data extraction & visualization) Basic: Fortran, labVIEW, C++
Python Packages	Matplotlib, Numpy, Scipy
Computational Codes	The Pencil-Code, RADMC3D
Software & Tools	LaTeX, Microsoft Office, Linux
Languages	Spanish(Native), English(Native)