Michael Hammer

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RESEARCH STATEMENT

I use supercomputers to conduct hydrodynamic simulations of planets in protoplanetary discs. My goal is to develop radiative transfer models of simulations to explain disc observations in order to better understand planet formation.

EDUCATION

University of Arizona, *Tucson, AZ* — August 2015 – Present
Ph.D. Candidate in Astronomy and Astrophysics — Advisor: Professor Kaitlin Kratter

Cornell University, College of Arts and Sciences, *Ithaca, NY* — May 2015
B.A. in Physics with an Astrophysics Concentration — [Minor in Computer Science]

AWARDS

(1) NASA Space Grant Fellowship ($16K / yr for 1 yr) — August 2020 – August 2021
(2) NSF Graduate Research Fellowship ($34K / yr for 3 yrs) — August 2015 – August 2020

PUBLICATIONS (**2 first-author + 2 first-author in prep.**, 9 total)

[1] **Hammer, M.**, Pinilla, P., Kratter, K., Lin, M.-K., *Effects of dust feedback on elongated planet-induced vortices* (in prep.)

[2] **Hammer, M.**, Lin, M.-K., Kratter, K., Pinilla, P., *Which planets trigger longer-lived vortices: low-mass or high-mass?* (in prep.)

[3] Su, K., Jackson, A., Gáspár, A., Rieke, G. et al. including **Hammer, M.,** 2019, *Extreme Debris Disk Variability: Exploring the Diverse Outcomes of Large Asteroid Impacts During the Era of Terrestrial Planet Formation*, AJ, 157, 202 (ADS link)

[4] **Hammer, M.**, Pinilla, P., Kratter, K., Lin, M.-K., 2019, *Observational diagnostics of elongated planet-induced vortices with realistic planet formation time-scales*, MNRAS, 482, 3609 (ADS link)

[5] Kozarev, K., Davey, A., Kendrick, A., **Hammer, M.**, Keith, C., 2017, *The Coronal Analysis of SHocks and Waves (CASHeW) framework*, JSWSC, 7A, 32 (ADS link)

[6] **Hammer, M.**, Kratter, K., Lin, M.-K., 2017, *Slowly-growing gap-opening planets trigger weaker vortices*, MNRAS, 466, 3533 (ADS link)

[7] Jílková, L., Hamers, A., **Hammer, M.**, Portegies Zwart, S., 2016, *Mass transfer between debris discs during close stellar encounters*, MNRAS, 457, 4218 (ADS link)

[8] Jílková, L., Portegies Zwart, S., Pijloo, T., **Hammer, M.** 2015, *How Sedna and family were captured in a close encounter with a solar sibling*, MNRAS, 453, 3157 (ADS link)

[9] Kozarev, K. A., Raymond, J. C., Lobzin, V. V., **Hammer, M.** 2014, *Properties of a Coronal Shock Wave as a Driver of Early SEP Acceleration*, ApJ, 799, 167 (ADS link)

TALKS (conference talks in bold)

Planet-induced vortices: The effects of realistic planet formation timescales (Version 2)

(1) API Exoplanets & Disks Group Meeting *(Amsterdam, The Netherlands)* September 2019
(2) ESO Lunch Talk *(Garching, Germany)* September 2019
(3) **From protoplanetary discs to planetary systems** *(Kreuth, Germany)* September 2019
(4) MPIA Star and Planet Formation Coffee *(Heidelberg, Germany)* September 2019
(5) **Star and Planet Formation in the Southwest 2** *(Oracle, AZ)* March 2018

Planet-induced vortices: The effects of realistic planet formation timescales (Version 1)

(1) **Protoplanetary Disk Meeting** *(Los Alamos, NM)* August 2017
(2) Steward Observatory Internal Symposium *(Tucson, AZ)* September 2016
(3) **Emerging Researchers in Exoplanets Symposium** *(Ithaca, NY)* June 2016

Transferring Disks during Stellar Flybys

(1) LEAPS Symposium *(Leiden, The Netherlands)* August 2014

Kinematics of Waves in the Solar Corona

(1) SAO Solar Physics REU Symposium (Cambridge, MA) August 2013

POSTERS

[1] **Hammer, M.**, Muñoz, D., Lai, D., 2015, *Can circumbinary planets survive in inclined orbits?*, Cornell Astronomy Undergraduate Research Poster Forum (PDF)

[2] **Hammer, M.**, Jílková, L., Portegies Zwart, S., 2015, *Transferring Mass between Circumstellar Disks during Stellar Flybys*. AAS Meeting 225, #349.02 (PDF)

[3] **Hammer, M.**, Kozarev, K. A., Korreck, K. E., 2014, Kinematics of Waves in the Solar Corona: Analyzing Potential Shock Waves to Predict Solar Energetic Particle Fluxes in Space Weather. AAS Meeting 223, #158.02 (PDF)

[4] **Hammer, M.**, et al. 2014, The Cornell Astronomical Society: The Student Experience of Running an Observatory. AAS Meeting 223, #160.03 (PDF)

WORKSHOPS

(1) Alan Alda Science Communication Workshop (*Tucson, AZ)* February 2019
(2) NExSS Winter School: *Planetary Habitability (Oracle, AZ)* February 2016

(3) NExScI Sagan Workshop: *Exoplanet Demographics (Pasadena, CA)* July 2015

TEACHING

[1] **ASTR 250: Fundamentals of Astronomy** *(University of Arizona)* Spring 2020
First course for astronomy majors. <Highlight: Designed homework using Astrobites>

[2] **ASTR 300A: Dynamics of Astrophysics** *(University of Arizona)* Fall 2018
Second course for astronomy majors. <Highlight: Led computational activity>

[3] **CS 6780: Advanced Machine Learning** *(Cornell University)* Spring 2015
Graduate-level introduction to machine learning. <Highlight: Graded homework>

OUTREACH (selected)

(A) **NASA Space Grant Fellow**, University of Arizona August 2020 – Present
Designing HW assignments on how to read papers using Astrobites for various courses

(B) **Instructor**, UA Sky School August 2019 – Present
Facilitating elementary school student teams in conducting three-day research projects

(C) **Teacher-in-training**, ISEE Professional Development Program March 2019 – June 2019
Designed and taught full-day inquiry activity to undergraduates in AstroCom NYC

(D) **Author**, Astrobites December 2015 – Present
(i) https://astrobites.org/author/mhammer/, (ii) Advertising chair, (iii) Social media czar

(E) **Outreach Coordinator**, Cornell Society of Physics Students Jan. 2012 – Jan. 2015
(i) Organized outreach events, (ii) Recruited students for events, (iii) Managed website

(F) **President**, Cornell Astronomical Society June 2013 – June 2014
(i) Ran weekly stargazing nights, (ii) Gave public lectures, (iii) Set up Astro. Dept. events