

# Alexander J. Dittmann

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## EDUCATION

2018-present	Graduate study in Astronomy, University of Maryland
2018-2020	M.S. in Astronomy, University of Maryland
2014-2018	B.S. <i>with Highest Distinction</i> in Physics, University of Illinois
2014-2018	B.S. <i>with High Distinction</i> in Astronomy, University of Illinois

## RESEARCH EXPERIENCE

2020, Fall	Pre-doctoral Research Assistant, Flatiron CCA	astrophysics
2018-present	Graduate Research Assistant, University of Maryland	astrophysics
2016-2018	Research Assistant, University of Illinois	astrophysics
2016, Summer	SULI Research Assistant, General Atomics	plasma physics
2014-2015	Summer Research Assistant, Catholic University of America	nuclear physics

## FELLOWSHIPS AND AWARDS

2021	Outstanding Research Assistant University of Maryland Graduate School
2020	CCA Pre-Doctoral Fellowship Flatiron Institute Center for Computational Astrophysics, Fall 2020
2018	Graduate School Dean's Fellowship University of Maryland, Fall 2018 - Summer 2019
2018	Wyatt Award - graduating Astronomy major with most outstanding GPA and research University of Illinois, Department of Astronomy, Spring 2018

## PUBLICATIONS

### Submitted

2022	An Analytic, Fully Relativistic Framework for Tidal Disruption Streams in Schwarzschild Geometry <b>Dittmann, A. J.</b>
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## Journal Articles

Summary: 16 published, 6 first-author, 3 single-author

- 2021 On the Terminal Spins of Accreting Stars and Planets: Boundary Layers  
**Dittmann, A. J.**, MNRAS 508, 1842
- 2021 Preventing Anomalous Torques in Circumbinary Accretion Simulations  
**Dittmann, A. J.**, Ryan, G., ApJ 921, 71
- 2021 The Radius of PSR J0740+6620 from NICER and XMM-Newton Data  
Miller, M. C., Lamb, F. K., **Dittmann, A. J.**, et al., ApJL 918, L28
- 2021 NICER Detection of Thermal X-Ray Pulsations from the Massive Millisecond Pulsars PSR J0740+6620 and PSR J1614-2230  
Wolff, M., **et al.**, ApJL 918, L26
- 2021 Accretion onto Stars in the Disks of Active Galactic Nuclei  
**Dittmann, A. J.**, Cantiello, M., Jermyn, A. S. , ApJ 916, 48
- 2021 Stellar Evolution in the Disks of Active Galactic Nuclei Produces Rapidly Rotating Massive Stars  
Jermyn, A. S., **Dittmann, A. J.**, Cantiello, M., Perna, R., ApJ 914, 105
- 2021 Constraining the Neutron Star Mass-Radius Relation and Dense Matter Equation of State with NICER. III. Model and Systematics  
Bogdanov **et al.**, ApJL 914, L15
- 2021 High-Order Multiderivative IMEX Schemes  
**Dittmann, A. J.** Applied Numerical Mathematics 160, 205
- 2020 Modified Hermite Integrators of Arbitrary Order  
**Dittmann, A. J.**, MNRAS 496, 1217
- 2020 Star Formation in Accretion Disks and SMBH Growth  
**Dittmann, A. J.**, Miller, M. C., MNRAS 493, 3732
- 2019 PSR J0030+0451 Mass and Radius from NICER Data and Implications for the Properties of Neutron Star Matter  
Miller, M. C., Lamb, F. K., **Dittmann, A. J.**, et al., ApJL 887, L24
- 2019 Constraining the Neutron Star Mass-Radius Relation and Dense Matter Equation of State with NICER. II. Emission from Hot Spots on a Rapidly Rotating Neutron Star  
Bogdanov S. **et al.**, ApJL 887, L26
- 2018 A Candidate Tidal Disruption Event in a Quasar at  $z = 2.359$  from Abundance Ratio Variability  
Liu, X., **Dittmann, A. J.**, Shen, Y., Jiang, L., ApJ 859, 8
- 2018 Separated kaon electroproduction cross section and the kaon form factor from 6 GeV JLab data  
Carmignotto, M. **et al.**, PhysRevC 97, 025204
- 2017 The Aerogel Čerenkov detector for the SHMS magnetic spectrometer in Hall C at Jefferson Lab  
Horn, T. **et al.**, NIMA 842, 28
- 2015 PSR J1930-1852: A Pulsar in the Widest Known Orbit Around Another Neutron Star  
Swiggum, J. K. **et al.**, ApJ 805, 156

## ORAL PRESENTATIONS

- 2021 Neutron Star Masses and Radii from NICER Data, invited, JSI Minisymposium on “Neutron Stars and Dense Matter” (UMD), December 10
- 2021 The orbital evolution and appearance of binaries fed by circumbinary disks, invited, Center for Theory and Computing Seminar (UMD), November 10
- 2021 Measuring the Heaviest Known Neutron Star: the Radius of PSR J0740 from X-ray Data, invited, Compact Objects Group Meeting (CCA), April 22
- 2021 Circumbinary Disks, sink particles, and making simulations less sensitive to tuning parameters, invited, Hernquist Group Meeting (CfA), March 5
- 2021 Stellar Evolution in AGN Disks, invited, Flatiron/CCA Predoc Symposium, February 26
- 2021 Circumbinary Disks, sink particles, and making simulations less sensitive to tuning parameters, invited, Compact Objects Group Meeting (CCA), January 28
- 2020 Stars in AGN disks, CCA lunch talk, contributed, October 1
- 2015 Exploring the potential for studies of the electromagnetic structure of the kaon at 12 GeV JLab, contributed talk, APS DNP, October 31

## POSTER PRESENTATIONS

- 2018 A Time-domain Analysis of Nitrogen-Rich Quasars, contributed, Winter AAS, January 10
- 2016 Ray-tracing studies of fast waves in the lower hybrid range of frequencies, contributed, APS DPP, November 1
- 2014 The Optical Characterization of Aerogel Tiles for Cherenkov Detectors at Jefferson Lab, contributed, APS DNP, October 10

## TEACHING EXPERIENCE

### University of Maryland

2020 - spring	Theoretical Astrophysics	wrote and taught discussions, graded
2020 - spring	Black Holes	graded, helped update lecture material
2019 - fall	General Astronomy	presented 3 lectures, taught discussions and labs, graded
2019 - spring	General Astronomy	taught and graded discussions and labs
2018 - fall	General Astronomy	taught and graded discussions and labs

## COMPUTING

Languages C, Python, Fortran, CUDA, IDL  
 Tools git, SLURM

## SERVICE AND OUTREACH

### Journals

Referee ApJ, MNRAS

## GRAD-MAP<sup>1</sup>

Winter Workshop mentoring	N-body simulations of stellar binaries and SMBHs (2020), the perturbed circular restricted 3-body problem (2022)
Winter Workshop Python Bootcamp	Co-lead (2022), lecture teaching/planning (2020, 2021)
Summer Scholars mentoring	Hydrodynamic simulations of tidal disruption event streams
Summer Scholars teaching	Lectured on visualizing multidimensional data using Python and an introduction to programming in C

## Undergraduate Curriculum

Introductory labs    revised, restructured, and tested new labs

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<sup>1</sup><https://www.umdgradmap.org/>