Alexander J. Dittmann

University of Maryland
Department of Astronomy
1235 Atlantic Building
College Park MD 20742

Email: dittmann@astro.umd.edu
ORCID: 0000-0001-6157-6722
Homepage: https://ajdittmann.github.io/
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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. *with Highest Distinction* in Physics, University of Illinois
2014-2018	B.S. *with High Distinction* 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

2022 Bruno Rossi Prize, co-awardee with the NICER team
American Astronomical Society, High Energy Astrophysics Division

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 A Survey of Disc Thickness and Viscosity in Circumbinary Accretion: Binary Evolution, Variability, and Disc Morphology
Dittmann, A. J., Ryan, G.

2022 Effects of an Immortal Stellar Population in AGN Disks
Jermyn, A. S., **et al.**, ApJ, accepted.

Journal Articles

Summary: 17 published, 7 first-author, 4 single-author

2022 An Analytical, Fully Relativistic Framework for Tidal Disruption Event Streams in Schwarzschild Geometry
Dittmann, A. J., MNRAS 511, 3408

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

2022 The orbital evolution and appearance of binaries fed by circumbinary disks, invited, Gravitational Astrophysics Laboratory lunch seminar (GSFC), February 24

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	MNRAS, ApJ

GRAD-MAP[1]

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

[1] https://www.umdgradmap.org/