Christopher J. White **Flatiron/Princeton Research Fellow**
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c-white.github.io **Flatiron Institute, Simons Foundation**

Curriculum Vitae

Research Interests

I am an astrophysical fluid dynamicist specializing in high-energy systems, especially accretion onto black holes. My research uses theoretical and large-scale computational tools for magnetohydrodynamics, as well as radiation and plasma physics, often in the strong-gravity regime. I am one of the main developers of the `Athena++` code, and I have also written the general-relativistic ray tracer `Blacklight`.

Education and Positions Held

Princeton University and Flatiron Institute 2020–present
Princeton/Flatiron postdoctoral fellow,
Department of Astrophysical Sciences and Center for Computational Astrophysics

University of California, Berkeley and Santa Barbara 2016–2020
Postdoctoral researcher,
Theoretical Astrophysics Center and Kavli Institute for Theoretical Physics

Princeton University 2011–2016
Degrees: Doctor of Philosophy (2016) and Master of Science (2013)
Subject: Astrophysics

California Institute of Technology 2007–2011
Degree: Bachelor of Science (2011, with honors)
Majors: Physics and Mathematics
Minor: Philosophy

First-Author and Equal-Contributor Publications

An Extension of the Athena++ Code Framework for 2023 ApJ 949 103
Radiation-magnetohydrodynamics in General Relativity
Using a Finite-solid-angle Discretization
C. J. White et al.

Blacklight: A General-relativistic Ray-tracing and Analysis Tool 2022 ApJS 262 28
C. J. White

Remarkable Correspondence of the Sagittarius A* Submillimeter 2022 ApJL 932 L21
Variability with a Stellar-wind-fed Accretion Flow Model
L. Murchikova, C. J. White, S. M. Ressler

The Effects of Tilt on the Time Variability of Millimeter 2022 ApJ 926 136
and Infrared Emission from Sagittarius A*
C. J. White, E. Quataert

On the Origin of Pulsar and Magnetar Magnetic Fields 2022 ApJ 926 111
C. J. White, A. Burrows, M. S. B. Coleman, D. Vartanyan

The effects of resolution on black hole accretion simulations of jets 2020 MNRAS 498 2428
C. J. White, F. Chrystal

First-Author and Equal-Contributor Publications (continued)

The Effects of Tilt on the Images of Black Hole Accretion Flows C. J. White, J. Dexter, O. Blaes, E. Quataert	2020 ApJ 894 14
The Structure of Radiatively Inefficient Black Hole Accretion Flows C. J. White, E. Quataert, C. F. Gammie	2020 ApJ 891 63
Tilted Disks around Black Holes: A Numerical Parameter *Survey for Spin and Inclination Angle* C. J. White, E. Quataert, O. Blaes	2019 ApJ 878 51
A Resolution Study of Magnetically Arrested Disks C. J. White, J. M. Stone, E. Quataert	2019 ApJ 874 168
Development and Application of Numerical Techniques *for General-Relativistic Magnetohydrodynamics* *Simulations of Black Hole Accretion* C. J. White	2016 PhD thesis
An Extension of the Athena++ Code Framework for GRMHD Based on *Advanced Riemann Solvers and Staggered-Mesh Constrained Transport* C. J. White, J. M. Stone, C. F. Gammie	2016 ApJS 225 22
Slow-speed Supernovae from the Palomar Transient Factory: Two Channels C. J. White et al.	2015 ApJ 799 52

Additional Publications

Millimeter observational signatures of flares in *magnetically arrested black hole accretion models* H. Jia, et al.	2023 MNRAS 526 2924
Gravitational-wave signature of core-collapse Supernovae D. Vartanyan et al.	2023 PhRvD 107 103015
Wind-fed GRMHD simulations of Sagittarius A*: *tilt and alignment of jets and accretion discs, electron thermodynamics,* *and multiscale modelling of the rotation measure* S. M. Ressler, C. J. White, E. Quataert	2023 MNRAS 521 4277
Magnetic Flux Transport in Radiatively Inefficient Accretion Flows and the *Pathway toward a Magnetically Arrested Disk* P. Dhang, X. Bai, C. J. White	2023 ApJ 944 182
Observational signatures of black hole accretion: *rotating versus spherical flows with tilted magnetic fields* H. Jia, C. J. White, E. Quataert, S. M. Ressler	2022 MNRAS 515 1392
Magnetically Modified Spherical Accretion in GRMHD: *Reconnection-Driven Convection and Jet Propagation* S. M. Ressler, E. Quataert, C. J. White, O. Blaes	2021 MNRAS 504 6076

Additional Publications (continued)

Numerical Simulation of Hot Accretion Flows (IV): Effects of   2021 ApJ 914 131
Black Hole Spin and Magnetic Field Strength on the Wind
and the Comparison between Wind and Jet Properties
H. Yang, F. Yuan, Y. Yuan, C. J. White.

Looking for the underlying cause of black hole   2020 MNRAS 496 3808
X-ray variability in GRMHD simulations
D. A. Bollimpalli et al.

The Athena++ Adaptive Mesh Refinement Framework: 2020 ApJS 249 4
Design and Magnetohydrodynamic Solvers
J. M. Stone, K. Tomida, C. J. White, K. G. Felker

Ab Initio Horizon-scale Simulations of Magnetically Arrested   2020 ApJL 896 L6
Accretion in Sagittarius A* Fed by Stellar Winds
S. M. Ressler, C. J. White, E. Quataert, J. M. Stone

Remnants of Sub-Dwarf Helium Donor Stars Ejected from   2019 ApJ 887 68
Close Binaries with Thermonuclear Supernovae
E. B. Bauer, C. J. White, L. Bildsten

The Event Horizon General Relativistic Magnetohydrodynamic   2019 ApJS 243 26
Code Comparison Project
O. Porth et al.

Stability of metal-rich very massive stars   2016 MNRAS 456 525
J. Goodman, C. J. White

Collaboration Publications

First Sagittarius A* Event Horizon Telescope Results.   2022 ApJL 930 L12
I. The Shadow of the Supermassive Black Hole
in the Center of the Milky Way
EHT Collaboration

First Sagittarius A* Event Horizon Telescope Results.   2022 ApJL 930 L16
V. Testing Astrophysical Models of the Galactic Center Black Hole
EHT Collaboration

Proposals

DOE INCITE: Polaris, Frontier   2023
110,900 + 1,000,000 node-hours to study radiation-dominated black hole accretion.
(PI: Stone)

DOE INCITE: Theta, Polaris   2023
2,500,000 + 300,000 node-hours to study core-collapse supernovae. (PI: Burrows)

Proposals (continued)

NSF/XSEDE: Stampede2, Bridges   2022–2023
159,900 node-hours + 2,000,000 core-hours to study the implications of angular momentum in black hole accretion. (TG-AST200005, PI: Ressler)

NSF/XSEDE: Stampede2, Bridges   2021–2022
239,000 node-hours to study gas dynamics around black holes.
(TG-AST200005, PI: Ressler)

NSF/XSEDE: Comet   2020–2021
1,440,000 core-hours to study black hole accretion with low angular momentum.
(TG-AST200005, PI: Ressler)

NSF/XSEDE: Stampede2   2019–2020
347,000 node-hours to study disk oscillations, observable emission signatures, and disk breaking. (TG-AST170012)

NSF/XSEDE: Stampede2   2018–2019
500,000 node-hours to study orientation of magnetic fields in tilted disks, resolution effects in relativistic jets, the long-term steady-state behavior of GRMHD simulations, and the dynamics of thin tilted disks. (TG-AST170012)

NSF/XSEDE: Comet   2017–2018
760,000 core-hours to conduct a parameter survey of tilted disk dynamics.
(TG-AST170012)

Conferences Organized

Astrophysics of Fast Radio Bursts II   September 2023
CCA, New York

Athena++ Workshop   May 2023
CCA, New York

The Frontiers of Event Horizon Scale Accretion   October 2020
KITP, Santa Barbara

Colloquia

Black Hole Accretion: How to Connect Simulations to Observations   March 2022
and Learn Something in the Process
Physics and Astronomy Colloquium at UNLV

The Lessons Being Learned by Imaging Black Holes   March 2021
Physics Colloquium at Texas Tech University

Observable Consequences of Tilted Disks around Black Holes   October 2020
Physics Colloquium at CoC, Charleston

Additional Presentations

Seminar: CITA, Toronto	October 2023
Workshop: North American Einstein Toolkit School, Rochester	July 2023
Workshop: Athena++, CCA, New York	May 2023
Conference: New Frontiers in GRMHD Simulations, Online	April 2023
Conference: AGN Santa Fe	March 2023
Conference: Improving Black Hole Accretion Models, Princeton	February 2023
Conference: Flatiron-wide Algorithms and Mathematics, CCA, New York	October 2022
Seminar: Princeton	July 2022
Conference: Distorted Astrophysical Disks, Cambridge	May 2021
Seminar: Gravity Initiative, Princeton	March 2021
Workshop: Athena++, CCA, New York	October 2020
Seminar: KITP, Santa Barbara	June 2020
Seminar: UCSB Astronomy, Santa Barbara	February 2020
Workshop: Horizon Collaboration, CCA, New York	January 2020
Seminar: Astroplasmas, Princeton	November 2019
Seminar: JILA, Boulder	October 2019
Seminar: KITP, Santa Barbara	September 2019
Conference: Centenary of Astrophysical Jets, Cheshire	July 2019
Seminar: KITP, Santa Barbara	June 2019
Workshop: Horizon Collaboration, Princeton	April 2019
Workshop: Athena++, Las Vegas	March 2019
Seminar: Caltech TAPIR, Pasadena	February 2019
Seminar: UCSB Astronomy, Santa Barbara	January 2019
Workshop: ZTF Theory Meeting, Santa Barbara	December 2018
Seminar: KITP, Santa Barbara	July 2018
Seminar: UCSB Astronomy, Santa Barbara	February 2018
Workshop: Horizon Collaboration, CCA, New York	January 2018
Seminar: UCB Postdoc and Grad Student, Berkeley	March 2017
Seminar: KITP, Santa Barbara	February 2017
Seminar: UCB Astronomy, Berkeley	February 2017
Workshop: Horizon Collaboration, Berkeley	January 2017
Conference: Simulations and Modelling of Relativistic Accretion Discs, Oxford	July 2016
Public Talk: Princeton	May 2016
Workshop: Horizon Collaboration, Berkeley	January 2016
Conference: Black Hole Accretion and AGN Feedback, Shanghai	June 2015
Workshop: ZTF Meeting, Pasadena	December 2014
Conference: AAS Meeting 223, 434.04	January 2014
Conference: AAS Meeting 222, 317.09	June 2013
Seminar: Carnegie Observatories, Pasadena	August 2012

Teaching and Outreach Experience

Summer School 2023
Taught computational fluid dynamics, especially finite-volume methods in the
context of high-performance computing.

Public Observing 2011–present
Helped to run many public observing sessions at multiple institutions.

Prison Teaching Initiative 2011–2015
Worked as a volunteer with a faculty, researchers, and students at Princeton to give
inmates in state prisons another chance at education. Focused on mathematics and
astronomy courses.

Teaching Assistant at Princeton 2012
"Planets in the Universe" course for non-scientists. In addition to regular teaching
duties, involved instructing students in hands-on observing sessions.

Teaching Assistant at Caltech 2010–2011
Sophomore physics laboratory (4 terms). Oversaw experiments and also held
individual recitations with each student.

Technical Skills

Computing cluster experience
DOE-funded: Frontier, Polaris, Theta, Cori, Mira
NSF-funded: Frontera, Bridges, Stampede, Comet
Campus: Flatiron, Princeton, UCSB, UCB

Languages
C++, C, Python

Visualization and analysis
Python, VisIt

Software Tools
Git, GDB, DDT, VTune, Gprof, Valgrind. Extensive experience optimizing code for performance.