PERSONAL DETAILS

Name	Aaron White
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• Education

30/04/2021	**PhD** - *Thesis: Searches for the Rare Decay of the Higgs Boson to Two Muons and for New Physics in Dilepton Final States with the ATLAS Experiment* Physics Department, University of Michigan, USA Advisor: Bing Zhou
30/04/2015	**BSc, Highest Honors in Physics** - *Thesis: The Development, Construction, and Commissioning of the Liquid Argon Scintillation System for the POLARIS Experiment* Physics Department, University of Michigan, USA Advisor: Christine Aidala

• Current position

2025-now	**Research Fellow** - *FASER neutrino detector instrumentation and LHCb analysis* European Organization for Nuclear Research (CERN), Switzerland Supervisor: Jamie Boyd

• Previous position

2020-2025	**Postdoctoral Fellow** - *ATLAS muon detector commissioning, DAQ, DM search* Department of Physics, Harvard University, USA Supervisor: Melissa Franklin

Research projects

2025-now *Forward neutrino measurements with FASER*

I am project leader for the AHCAL prototype detector (26 person team). It is a 5 ton sampling calorimeter that was installed in the LHC tunnel in 2026. I wrote significant parts of the data acquisition software and trigger firmware logic in order to make AHCAL compatible with FASER readout. In 2026 we recorded 33 fb^{-1} of data, which should be sufficient to observe $\sim$30 ν_e and $\sim$150 ν_μ neutrinos. I am coordinating the analysis of the dataset. I am also an author on the Run 4 technical proposal, submitted for LHCC review September 2026. *Paper expected in early 2027*

2025-now *Search for Dimuonium with LHCb*

I am leading the search for the bound state of two muons. This state has never been observed, and would provide a unique laboratory to study muon-muon interactions for the first time. I proposed and implemented new trigger lines in 2026 to capture the double Dalitz decay ($\eta \to \ell^+\ell^-\mu^+\mu^-$). I am also involved in the dark photon search, as the phenomenology of dimuonium is very similar to that of dark photons. *Paper expected in late 2027.*

2024-2025 *Convenership of the CCS Sub-group*

I served as convener of the newly-formed Combinations, Crosstalk, and Summaries (CCS) sub-group ($\sim$ 20 person group) in the Exotics group. We published five public notes to highlight ATLAS contributions in diverse areas like dark matter, axion searches, and long-lived particles.

2020-2025 *Commissioning, Maintenance, and Operation of the New Small Wheels*

I worked as a postdoc to prepare the NSW for data taking. I supervised 12 undergrad and 5 PhD student projects. I was also responsible for two key ASICs in the front-end electronics: the VMM readout chip, and the GBTx transceiver. I wrote the communication library to configure the GBTx, and took on the responsibility for its calibration. I also wrote several calibrations for the VMM, including selecting thresholds, masking broken channels, and measuring effective thresholds.

2023-2024 *New Small Wheel Link Stability Task Force*

I led an emergency task force (8 person engineer/physicist team) in the muon group to investigate the problem of instability in the optical links from the NSW. The project was initiated when I noticed patterns in which optical links become unaligned during data taking. We found the cause and deployed a solution. The problem impacts all users of the CERN GBTx and lpGBTx ASICs. For this work, my team and I received the **2024 ATLAS Outstanding Achievement Award**.

2023-2024 *Summary of Simplified Dark Matter Models with s-Channel Mediators*

I led the summary of ATLAS constraints on simplified dark matter (DM) models with s-channel mediators as analysis contact (4 person group). I implemented a new procedure to reinterpret ATLAS limits in terms of the coupling of DM to Standard Model particles. I also proposed four new benchmarks for Run 2.

2016-2020 *Thesis: Search for $H \to \mu^+\mu^-$ at the ATLAS Experiment*

I received the **2016 Chateaubriand fellowship** to develop the search for $H \to \mu^+\mu^-$, leading to the identification of VH as a promising channel. I led the effort to consider the VH production mechanism in the search for $H \to \mu^+\mu^-$. The VH selection suppresses the dominant Drell-Yan background. I used a multivariate analysis trained on the associated vector bosons to reduce the remaining diboson backgrounds. The measured significance is 2.0 σ.

2018-2020 *Thesis: Search for Non-resonant Dilepton Phenomena at the ATLAS Experiment*

I led the search for non-resonant features in the dilepton spectra as analysis contact (9 person team). I developed new techniques for background estimates and modeling systematic uncertainties in fits. The result was published in JHEP with limits on four-point contact interaction scales reaching 35.8 (37.6) TeV. For this and other work I received the **2020 US ATLAS Outstanding Graduate Student Award**.

2017-2018 *Search for $Z' \to \ell\ell$ at the ATLAS Experiment*

I searched for new resonances Z' in the dilepton spectra. I worked on background modeling studies using SWIFT and Functional Decomposition methods. Limits on the Z' mass reached 5.1 TeV.

2015-2017 *Electronics for the Run 4 MDT Upgrade*

Authorship qualification for ATLAS. I simulated the impact of increased luminosity on the MDT electronics, showing that they were unsuitable for the HL-LHC event rate. I designed and tested a concept for a high-rate front-end upgrade for my authorship qualification task. The demonstration included an input emulator, a GBTx-type transceiver implemented in an FPGA, and DAQ software. The prototype was validated in a beam test.

I am an author on collaboration papers: **2026 LHCb** Collaboration, **2025-2026 FASER** Collaboration, **2015-2026 ATLAS** Collaboration, **2014 PHENIX** Collaboration

Selected Publications

[1] ATLAS Collaboration. The ATLAS experiment at the CERN Large Hadron Collider: a description of the detector configuration for Run 3, JINST, vol. 19, no. 05, p. P05063, 2024. arXiv: 2305.16623, 10.1088/1748-0221/19/05/P05063

[2] The ATLAS Collaboration. Differential cross-section measurements of $D^{\pm}$ and $D_s^{\pm}$ meson production in proton-proton collisions at $\sqrt{s}$ = 13 TeV with the ATLAS detector JHEP 07 (2025) 86. arXiv: 2412.15742, 10.1007/JHEP07(2025)086

[3] The ATLAS Collaboration. Constraints on dark matter models involving an *s*-channel mediator with the ATLAS detector in *pp* collisions at $\sqrt{s}$ = 13 TeV. Eur. Phys. J. C 84 (2024) 1102. arXiv: 2404.15930, 10.1140/epjc/s10052-024-13215-5

[4] The ATLAS Collaboration. A search for the dimuon decay of the Standard Model Higgs boson in pp collisions at $\sqrt{s}$=13 TeV with the ATLAS Detector. Physics Letters B Volume 812 (2021) 135980 arXiv: 2007.07830, 10.1016/j.physletb.2020.135980

[5] The ATLAS Collaboration. Search for new non-resonant phenomena in high-mass dilepton final states with the ATLAS detector. J. High Energ. Phys. 2020 (2020) 5 arXiv: 2006.12946, 10.1007/JHEP11(2020)005

[6] The ATLAS Collaboration. Search for high-mass dilepton resonances using 139 fb^{-1} of pp collision data collected at $\sqrt{s}$=13 TeV with the ATLAS detector. Phys.Lett.B 796 (2019) 68-87 arXiv: 1903.06248, 10.1016/j.physletb.2019.07.016

[7] Jesse B. Golden-Marx, M. S. Oey, J. B. Lamb, Andrew S. Graus, Aaron S. White. Classical Oe Stars in the Field of the Small Magellanic Cloud The Astrophysical Journal 819 (2016) 55 arXiv: 1601.03405, 10.3847/0004-637X/819/1/55

[8] K. C. Cady, A. S. White, J. H. Hammond, M. D. Abendroth, R. S. G. Karthikeyan, P. Lalitha, M. E. Zegans, G. A. O'Toole. Prevalence, conservation and functional analysis of Yersinia and Escherichia CRISPR regions in clinical Pseudomonas Aeruginosa isolates Microbiology 157 (2011), 430–437

Selected Public Physics Notes

[1] The ATLAS Collaboration. Summary plots for Higgs boson mediated hidden sector involving long-lived particles CDS (2025): ATL-PHYS-PUB-2025-039

[2] The ATLAS Collaboration. Dark matter summary plots for s-channel and dark Higgs models CDS (2025): ATL-PHYS-PUB-2025-041

[3] The ATLAS Collaboration. Summary plots for Heavy Neutral Leptons CDS (2025): ATL-PHYS-PUB-2025-038

[4] The ATLAS Collaboration. Summary plots for Axion-like particle models CDS (2025): ATL-PHYS-PUB-2025-043

[5] The ATLAS Collaboration. Dark matter summary plots for *s*-channel, 2HDM+*a*, Higgs portal and Dark Higgs models CDS (2024: ATL-PHYS-PUB-2024-010

[6] The ATLAS Collaboration. Search for non-resonant extra dimensions in high-mass dilepton final states at $\sqrt{s} = 13$ TeV using 139 fb^{-1} CDS (2021): ATL-PHYS-PUB-2021-021

[7] The ATLAS Collaboration. *Search for the dimuon decay of the Standard Model Higgs boson in pp collision at $\sqrt{s}$ =13 TeV with the ATLAS Detector*. Conference: EPS-HEP, 2019

[8] The ATLAS Collaboration. *A search for the rare decay of the Standard Model Higgs boson to dimuons in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS Detector*. Conference: ICHEP Seoul, 2018

Conference Talks [T] and Posters [P]

T 2026, FASER Collaboration Meeting, *AHCAL Prototype Results*

T 2026, USTC Summer School, *AHCAL, FASER, and Neutrinos*

T 2024, ICHEP Prague, *Heavy-flavour hadron production in ATLAS*

T 2023, ATLAS SUSY Workshop, *Critical Review: CDM Full Run 2 Programs*

T 2022, Higgs 2022, *Search for Rare Decays of the Standard Model Higgs Boson with the ATLAS Detector*

T 2020, Arizona Seminar, *Dileptons at ATLAS: Higgs Coupling to Two Muons and Other Results*

T 2020, Columbia Seminar, *Searches for $H \to \mu\mu$ and contact interactions in the dilepton mass spectra*

T 2020, Harvard Seminar, *Searches for $H \to \mu\mu$ and contact interactions in the dilepton mass spectra*

T 2020, UCI Seminar, *Searches for $H \to \mu\mu$ and contact interactions in the dilepton mass spectra*

T 2020, Notre Dame Seminar, *Searches for $H \to \mu\mu$ and contact interactions in the dilepton mass spectra*

T 2020, APS, *Search for new non-resonant phenomena in high-mass dilepton final states with the ATLAS detector*

T 2020, APS, *Search for new non-resonant phenomena in the TeV mass scale in dilepton final states in pp collisions at sqrt(s)=13 TeV with the ATLAS detector*

P 2020, LHCC, *Search for new non-resonant phenomena in the TeV mass scale in dilepton final states in pp collisions at sqrt(s)=13 TeV with the ATLAS detector*

T 2019, Exotics P&P Week, *Leptons For Moriond*

T 2019, ATLAS Exotics Workshop, *Modeling Background Tails and Background Reweighting*

T 2019, Moriond EW, *Search for Dilepton Resonances with the ATLAS Detector and Run 2 Data*. arXiv: 1906.08116

T 2018, US LUA, *A data driven search for non-resonant features in the dilepton spectra at ATLAS*

P 2018, ICHEP Seoul, *Search for SM $H \to \mu\mu$ with 79.8 fb^{-1} Data at 13 TeV with the ATLAS Detector*

P 2018, ATLAS Exotics Workshop, *Non-Resonant Search for Z Prime in a Data-Driven Framework*

T 2017, APS DPF, *Search for the dimuon decay of the Higgs boson with the ATLAS experiment*

T 2016, ATLAS Muon Week, *MDT CSM Demonstrator for Phase II*

T 2015, US ATLAS Workshop, *Simulation on Triggerless Operation of the Muon MDT TDCs*

P 2015, IEEE NSS-MIC, *Upgrade of the ATLAS Monitored Drift Tube Electronics for Phase II*

T 2014, CERN REU Symposium, *Chamber Service Module Readback for the ATLAS Muon System*

P 2013, APS DNP, *Direct Photon Simulations for Correlation Studies in 510 GeV Proton-Proton Collisions at PHENIX*

T 2013, Michigan REU Symposium, *Direct Photon Studies at PHENIX*

Selected Awards

- 2024, ATLAS Outstanding Achievement Award
- 2020, US-ATLAS Outstanding Graduate Student Award
- 2020, APS-DPF Gradslam research showcase finalist
- 2016, Chateaubriand Fellowship, Support to study from French Embassy Office of Science

Selected leadership and service

- 2026-now: Analysis contact for ν_μ cross-section measurement (FASER).
- 2026-now: Review Committee for proton structure parameters measurement (LHCb).
- 2025-now: Analysis contact for the search for dimuonium (LHCb).
- 2025-now: FASER AHCAL Project Leader (FASER).
- 2024-2025: Sub-convener of the CCS Physics Subgroup (ATLAS), editor of 5 PubNotes.
- 2025: Session organizer for ATLAS Exotics+HMBS Workshop (Edinburgh).
- 2024: Editor of the 2024 ATLAS Dark Matter Summary PubNote.
- 2024: Session organizer for ATLAS Exotics+HMBS Workshop (Bologna).
- 2023-2025: Analysis contact for the ATLAS Run 2 s-channel dark matter combination.
- 2023-2024: Sub-convener of the NSW GBT Link Stability Subgroup.
- 2023-2024: Editorial board member for the differential cross section measurement of D and D_s meson production.
- 2019-2020: Analysis contact for contact-interaction search with non-resonance signature in dilepton invariant spectra. Paper editor 2018-2020.

Teaching experience

Classes taught at the University of Michigan (as TA or otherwise):

- Spring 2017, Electricity and Magnetism: Physics 241 (four sections)
- Fall 2016, Electricity and Magnetism: Physics 241 (four sections)
- Spring 2016, Electricity and Magnetism: Physics 241 (two sections)
- Fall 2015, Electricity and Magnetism: Physics 241 (two sections)
- Fall 2014, I proposed and taught a one-semester course on particle physics for undergraduates. The class involved visits to many laboratories, including a weekend trip to Fermilab. Survey of Modern Particle Physics: Honors 135 (one section)

Graduate students supervised:
Laura Bruce (ATLAS qualification task), Kevin Greif (ATLAS qualification task), Michael Farrington (analysis).

Undergraduates supervised (with PI):
Kyuhyun Jang (2026), Yao Yin (2023-2024), Sirina Prasad (2024, 2022), Ismail Elmengad (2024), Adam Pearl (2023), Elizabeth Kosolv (2023), Mila Ivanoska (2023), Ali Kurmus (2023), Bella Tarantino (2022), Ian Leifer (2021), Kelechi Ukah (2021).