Harrison ("Harry") C. LaBollita

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CONTACT INFORMATION

PSF
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EDUCATION

Arizona State University, Tempe, Arizona — Exp. 2023
Ph.D. Physics
Advisor: A. S. Botana

Piedmont University, Demorest, Georgia — 2019
B.S. Applied Mathematics & Physics, *Summa Cum Laude*

PUBLICATIONS
Citations: 126
⋆ = equal contribution

H. LaBollita, M. Jung, and A. S. Botana, "Many-body electronic structure of $d^{9-\delta}$ nickelates," Phys. Rev. B (2022).

M. Jung, H. LaBollita, V. Pardo, and A. S. Botana, "Antiferromagnetic insulating state in layered nickelates at half filling," *Sci. Rep.* (2022).

X. Xiang⋆, H. LaBollita⋆ et al., "Visualizing the out-of-plane electronic correlations in an intercalated transition metal dichalcogenide," Phys. Rev. B **105**, L121107 (2022)

H. LaBollita and A. S. Botana, "Correlated electronic structure of a quintuple-layer nickelate," Phys. Rev. B **105** 085118 (2022).

G. A. Pan, D. F. Segedin, H. LaBollita et al., "Superconductivity in a quintuple-layer square-planar nickelate," Nature Materials 21, 160-164 (2022).

H. LaBollita and A. S. Botana, "Tuning the Van Hove singularities in AV_3Sb_5 (A = K, Rb, Cs) via pressure and doping," Phys. Rev. B **104**, 205129 (2021).

M. Akram⋆, H. LaBollita⋆, D. Dey, J. Kapeghian, A. S. Botana, and O. Erten, "Moiré skyrmions and chiral magnetic phases in twisted CrX_3 (X = I, Br, Cl) bilayers," Nano Letters 21, 15, 6633-6639 (2021).

H. LaBollita and A. S. Botana, "Electronic structure and magnetic properties of higher-order nickelates: $La_{n+1}Ni_nO_{2n+2}$ ($n = 4 - 6$)," Phys. Rev. B **104** 035148 (2021).

J. Krishna, H. LaBollita, A. O. Fumega, V. Pardo, and A.S. Botana, "Effects of Sr-doping on the electronic and spin-state properties of infinite-layer nickelates: Nature of holes," Phys. Rev. B **102**, 224506 (2020).

PRESENTATIONS
† = Talk
° = Poster

H. LaBollita† and A. S. Botana, "Correlated electronic structure of a quintuple-layer nickelate" APS March Meeting, Online due to COVID-19 — Mar. 2022
H. LaBollita† and A. S. Botana, "Electronic structure and magnetic properties of higher-order nickelates: $La_{n+1}Ni_nO_{2n+2}$ ($n = 4 - 6$)," APS March Meeting, Online due to COVID-19 — Mar. 2021
H. LaBollita†, "Hadronic Light-by-Light Contribution to the Anomalous Magnetic Moment of the Muon from the ω meson," QEP Research Symposium, Piedmont College — May 2019
H. LaBollita°, M. Hjorth-Jensen, S. Liddick, "Machine Learning Applied to Multi-Electron Events in Scintillator," APS March Meeting — Mar. 2019
H. LaBollita°, M. Hjorth-Jensen, S. Liddick, "Machine Learning Applied to Multi-Electron Events in Scintillator," REU Research Symposium, Michigan State Univeristy — Jul. 2018
H. LaBollita†, "Characterization of Mirror Birefrigence for ALPS," REU program, Univeristy of Florida — Aug. 2017

RESEARCH EXPERIENCE

Graduate Resarch Assistant, *Arizona State University* — 2020 – 23
Advisor: A. S. Botana
Currently, using a combination of density-functional theory (DFT) and dynamical mean-field theory

to understand the electronic structure of the nickel-oxide materials (nickelates). Experienced user of electronic structure codes: WIEN2k and VASP. Experienced user of the TRIQS software libraries to conduct DFT + DMFT calculations. Completed several projects in the Botana group using a variety of electronic structure tools and techniques.

Predoctoral Researcher, *Center for Computational Quantum Physics, Flatiron Institute* 2022
Advisor: A. Hampel and A. J. Millis
Contributed to open source software project TRIQS.

Research Rotation, *Arizona State University* 2019
Advisor: P. Sulc
Used machine learning and implemented a Gillespie algorithm to predict how a given RNA sequence will fold.

Senior Undergraduate Research, *Piedmont College* 2018 – 19
Advisor: N. Holt
Used effective field theory to calculate the hadronic light-by-light contributions to the anomalous magnetic moment of the muon from the ρ, π, and ω mesons.

Research Experience for Undergraduates, *Michigan State University* 2018
Advisor: M. Hjorth-Jensen
Applied supervised machine learning algorithms as a novel data analysis technique for an eperiment investigating the shape coexistence of the nucelus via converstion electron spectroscopy.

Research Experience for Undergraduates, *University of Florida* 2017
Advisors: D. Tanner and G. Mueller
Characterized the intrinsic birefringence of dielectric mirrors using a heterodyne polarimetric technique for the Any Light Particle Search (ALPS) experiment.

SOFTWARE

ris-2-bib: A command line tool to convert RIS bibliography files to bibtex format.

w2kplot: A Python wrapper to Matplotib to create publication quality figures from WIEN2k electronic structure calculations.

PortfolioOptim.jl: A Julia package for optimizing financial portfolios.

Contributor to open source projects: TRIQS/dft_tools, TRIQS/solid_dmft. For more details, please visit my GitHub page.

CONSULTING

Data science consulting for grant.

AWARDS & HONORS

Wally Stoelzel Scholarship	2021 – 22
Teaching Excellence Award, Graduate & Professional Student Association, ASU	2020
Arizona State University Summer Graduate Fellowship	2020
NCAA Postgraduate Scholarhsip	2019
Highest GPA Male Athlete, Piedmont College	2019
Scholar Athlete of the Year, Piedmont College	2019
Glenn W. & Edna Ellard Scholarship	2016 – 19
Seaborn Ashley & Dana Smith Ashely Scholarship	2016 – 18
Math & Physics Department Scholarship	2015 – 19
Trustee Scholarship	2015

TEACHING

Arizona State University, Tempe, AZ

Teaching Assistant, PHY 121: Mechanics for Engineers	Spring 2020
Teaching Assistant, PHY 131: Electricity & Magnetism for Engineers	Fall 2019, Fall 2020

Piedmont College, Demorest, GA

	Teaching Assistant	2018 – 19
	Math and Physics Tutor	2016 – 18
SERVICE	*Organizer*, Grad2Grad Talks, ASU Department of Physics	2021 –
	Graduate Student Representative, ASU Department of Physics Bylaws Committee	2021 – 22
	Mentor, ASU Sundial Project	2020 – 21
OUTREACH	*Instructor*, Clubes de Ciencia	2021
	Organizer, Maker Faire, *Henry Ford Museum*	2018
	Organizer, UF Center for Pre-Collegiate Education and Training, *University of Florida*	2017
MENTORSHIP	Adriana Baniecki, SCENE high-school student	2021
	Siva Buddy, SCENE high-school student	2020

References available upon request.