Harrison ("Harry") C. LaBollita

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CONTACT INFORMATION

PSF
Arizona State University
Tempe, AZ 85281, USA

harrisonlabollita@gmail.com
+1 (678) 895 - 8180

EDUCATION

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

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

PUBLICATIONS
Citations: 291
⋆ = equal contribution

H. LaBollita, A. Hampel, J. Karp, A. S. Botana, and A. J. Millis, "Conductivity of infinite-layer $NdNiO_2$ as a probe of spectator bands," Phys. Rev. B **107**, 205155 (2023)

D. F. Segedin, B. H. Goodge, G. A. Pan, Q. Song, H. LaBollita, et. al., "Limits to the strain engineering of layered-square planar nickelate thin films," Nat Commm **14**, 1468 (2023)

M. R. Norman, A. S. Botana, J. Karp, A. Hampel, H. LaBollita, et. al., "Orbtial polarization, charge transfer, and fluorescence in reduced valence nickelates," Phys. Rev. **107**, 165124 (2023)

Q. Song, et. al., "Antiferromagnetic metal phase in an electron doped rare earth nickelate," Nat. Phys. (2023)

G. Grissonnanche, G. A. Pan, H. LaBollita, et. al., "Seebeck coefficient in a nickelate superconductor: electronic dispersion in the strange metal phase," arxiv:2210.10987

H. LaBollita, M. Jung, and A. S. Botana, "Many-body electronic structure of $d^{9-\delta}$ nickelates," Phys. Rev. B **106**, 115132 (2022)

M. Jung, H. LaBollita, V. Pardo, and A. S. Botana, "Antiferromagnetic insulating state in layered nickelates at half filling," *Sci. Rep.* **12**, 17864 (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†, "Conductivity of infinite-layer $NdNiO_2$ as a probe of spectator bands" APS March Meeting, Las Vegas, NV, USA — Mar. 2023

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
Designed, performed, and published scientific research papers in computational physics (strongly correlated materials). Built andd contributed toopen-source scientific and data analytic software tools (see software portfolio). Excellent teamwork and collaboration skills demonstrated by simultaneously working on several projects with external research groups. Experience in technical communication evidenced by severalveral published peer-reviewed articles, conference presentations, and courses taught at the high-school and undergraduate level.

Predoctoral Researcher, *Center for Computational Quantum Physics, Flatiron Institute* 2022
Advisor: A. Hampel and A. J. Millis
Contributed several pull requests to open-source quantum embedding (DMFT) software developed at the Center for Computational Quantum Physics (CCQ). Proactively collaborated with several researcharch scientists to design and implement production quality software (in Python and C++) that met computational, mathematical, and physical requirements.

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.

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.