Joshua W. Foster

CONTACT INFORMATION

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EMPLOYMENT

Massachusetts Institute of Technology, Boston, MA

Pappalardo Fellow in Physics **2021 – 2024**

EDUCATION

University of Michigan, Ann Arbor, MI

Doctor of Philosophy **2016 – 2021**

Expected Graduation Date: May 2021
Advisor: Benjamin Safdi
GPA: 3.97

Indiana University, Bloomington, IN

Bachelor of Science in Physics and Mathematics, with Honors **2012 – 2016**

Advisor: V.A. Kostelecký
GPA: 3.96

HONORS AND AWARDS

APS Division of Particles and Fields Travel Award, 2019
PITT PACC Pheno Travel Award, 2019
Leinweber Center for Theoretical Physics Graduate Fellowship, 2018
NSF Graduate Research Fellowship Honorable Mention, 2016, 2017
Indiana University Outstanding Physics Graduate, 2016
Barry M. Goldwater Scholarship, 2015

SELECTED PUBLICATIONS

Authorship is listed in alphabetical order unless noted with †

C. Salemi and J. Foster†, et al. The search for low-mass axion dark matter with ABRACADABRA-10 cm. In preparation (Dec. 2020). To be submitted to *Nature Physics*.

J. Foster, et al. Dark Matter Interferometry.
Submitted to Phys. Rev. D. `arXiv:2009.14201 [hep-ph]`

C. Dessert, J. Foster, and B. Safdi. X-ray Searches for Axions from Super Star Clusters.
Submitted to Phys. Rev. Lett. `arXiv:2008.03305 [hep-ph]`

C. Dessert, J. Foster, Y. Kahn, and B. Safdi. Systematics in the XENON1T data: the 15-keV anti-axion. Submitted to Phys. Rev. D. `arXiv:2006.16220 [hep-ph]`

J. Foster† et al., Green Bank and Effelsberg Radio Telescope Searches for Axion Dark Matter Conversion in Neutron Star Magnetospheres. Accepted in Phys. Rev. Lett.
`arXiv:2004.00011 [astro-ph.CO]`

C. Dessert, J. Foster, and B. Safdi. Hard X-Ray Excess from the Magnificent Seven Neutron Stars. Accepted to ApJ. `arXiv:1910.02956 [astro-ph.HE]`

M. Buschmann, J. Foster, and B. Safdi. Early University Simulations of the Cosmological Axion. *Phys. Rev. Lett.* **124** (2020) 16, 161103.
`arXiv:1906.0096 [astro-ph.CO]`

J. Ouellet, C. Salemi, J. Foster† et al. Design and Implementation of the ABRACADABRA-10 cm Axion Dark Matter Search. *Phys. Rev.* **D99** (2019) 052012.

arXiv:1901.10652 [ins-det]

J. Ouellet, C. Salemi, J. Foster† et al. First Results from ABRACADABRA-10 cm: A Search for Sub-μeV Axion Dark Matter. *Phys. Rev. Lett.* **122** (2019), 8, 121802. arXiv:1810.12257 [hep-ex]

J. Foster, N. Rodd, and B. Safdi. Revealing the Dark Matter Halo with Axion Direct Detection. *Phys. Rev.* **D97** (2018), 12, 123006. arXiv:1711.10489 [astro-ph].

J. Foster and J.T Liu. Spatial Anisotropy in Nonrelativistic Holography arXiv:1612.01557 [hep-th].

J. Foster, V.A. Kostelecký, and R. Xu. Constraints on Nonmetricity from Bounds on Lorentz Violation. *Phys. Rev.* **D95** (2017) 8, 084033. arXiv:1612.08744 [gr-qc].

Selected Talks

"Radio Astronomy for the Detection of Axion Dark Matter"
University of Maryland. Virtual (October 26, 2020)

"Astrophysical Searches for Axions"
BSM Pandemic Virtual Seminar (October 9, 2020)

"Indirect Detection of Axions"
Perimeter Institute for Theoretical Physics Seminar.
Virtual (September 15, 2020)

"Post-Inflationary Axion Production"
Caltech Seminar. Virtual (August 13, 2020)

"The Dark Matter Axion Mass"
Axion Cosmology, Munich Institute for Astro- and Particle Physics.
Munich, Germany (March 6, 2020)

"Constraints on Axion Dark Matter from Searches for Radio Signals at Neutron Stars"
APS Division of Particles and Fields Meeting. Boston, MA (July 31 2019)

"Radio Constraints on Axion Dark Matter"
Indirect Searches for New Physics Across the Scales, Mainz, Germany (July 5, 2019)

"Constraints on Axion Dark Matter from Searches for Radio Signals at Neutron Stars"
Pheno 2019. Pittsburgh, PA (May 6, 2019)

"A Statistical Framework for Axion Direct Detection: Applications to ABRA-10cm and Beyond"
APS April Meeting 2019. Denver, CO (April 162019)

"Axions, Direct Detection, and ABRACADABRA"
Michigan HEP-Astro Department Seminar. Ann Arbor, MI (January 28, 2019)

"Dark Matter Substructure and Axion Astronomy"
Pheno 2018. Pittsburgh, PA (May 7, 2018)

"Signatures of dark-matter sub-structure in axion direct detection experiments"
TEVPA 2017. Columbus, OH (August 10, 2017)

Workshops, Schools, Conferences

MIAPP Axion Cosmology, Munich, Germany (23 Feb - 13 March 2019)

APS Division of Particles and Fields, Boston, MA (29 July - 2 August 2019)

Axions in the Lab and in the Cosmos, Geneva, Switzerland (15-19 July 2019)

Indirect Searches for New Physics Across the Scales, Mainz, Germany (1-12 July 2019)

Pheno 2019, Pittsburgh, PA (6-8 May 2019)

APS April 2019, Denver, CO (13-16 April 2019)

TASI 2018, Boulder, CO (4-29 June 2018)

Pheno 2018, Pittsburgh, PA (7-9 May 2018)

TeV Particle Astrophysics, Columbus, OH (7-11 August 2017)

Teaching

University of Michigan, Ann Arbor, MI

Graduate Student Instructor, Physics 360: Honors Physics III	**Fall 2019**
Graduate Student Instructor, Physics 390: Introduction to Modern Physics	**2018-2019**
Grader, Physics 521: Particle Physics I	**Winter 2018**
Graduate Student Instructor, Physics 140: General Physics I	**2016 - 2017**

Service

University of Michigan, Ann Arbor, MI

Member, Physics Department Colloquium Committee	**2017 – 2019**
Organizer, Phenomenology Journal Club	**2017 – 2019**
Member, Physics Graduate Council	**2017 – 2019**
Organizer, Theory Graduate Journal Club	**2017-2018**