

Lina Necib

🏠 Observatories of the Carnegie Institution for Science
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EMPLOYMENT

- 2020– Present **Postdoctoral Fellow**
Carnegie Observatories
- 2020– 2020 **University of California Presidential Fellow**
DEPARTMENT OF PHYSICS AND ASTRONOMY
University of California, Irvine
- 2017 – 2020 **Sherman Fairchild Postdoctoral Fellow**
WALTER BURKE INSTITUTE FOR THEORETICAL PHYSICS
California Institute of Technology

EDUCATION

- 2012 – 2017 **Doctor of Philosophy**
THEORETICAL HIGH ENERGY PHYSICS
ADVISOR: Prof. Jesse Thaler
THESIS TITLE: Boosting Searches for Dark Matter
Massachusetts Institute of Technology
- 2008 – 2012 **Bachelor of Arts in Physics and Mathematics**
SUMMA CUM LAUDE WITH DISTINCTION IN PHYSICS
Boston University

AWARDS

- 2020 **Carnegie Postdoctoral Fellowship in Theoretical Astrophysics**
Carnegie Observatories
- 2020 **University of California Presidential Fellowship**
University of California Irvine
- 2017–2020 **Sherman Fairchild Postdoctoral Fellowship**
California Institute of Technology
- 2016 **Sergio Vazquez Prize**
Massachusetts Institute of Technology
- 2012 **Praecis Presidential Graduate Fellowship**
Massachusetts Institute of Technology
- 2012 **Alumni Prize for Excellence in Physics**
Boston University
- 2012 **Phi Beta Kappa**
Boston University
- 2011 **College Scholar**
Boston University
- 2009–2012 **Dean's List**
Boston University

PUBLICATIONS

Author list in theoretical high energy physics is ordered alphabetically (not reflecting relative contributions to the paper), unless indicated otherwise with †. For alphabetically ordered papers, the lead author is designated by a ‡.

- 17) Laura J. Chang, **Lina Necib**,
Dark Matter Density Profiles in Dwarf Galaxies: Linking Jeans Modeling Systematics and Observation. Submitted to *MNRAS*/
ARXIV:2009.00613
- 16) Joshua Berger‡, Yanou Cui, Matthew Graham, **Lina Necib**,
Gianluca Petrillo, Dane Stocks, Yun-Tse Tsai, Yue Zhao.
Prospects for Detecting Boosted Dark Matter in DUNE through Hadronic Interactions. Submitted to *Phys.Rev.Lett*/
ARXIV:1912.05558
- 15†) **Lina Necib**, Bryan Ostdiek, Mariangela Lisanti,
Timothy Cohen, Marat Freytsis, Shea Garrison-Kimmel.
Chasing Accreted Structures within Gaia DR2 using Deep Learning. *ApJ* **903** no.1, 25/
ARXIV:1907.07681
- 14†) **Lina Necib**, Bryan Ostdiek, Mariangela Lisanti,
Timothy Cohen, Marat Freytsis, Shea Garrison-Kimmel, Philip F. Hopkins,
Andrew Wetzel, Robyn Sanderson.
Evidence for a Vast Prograde Stellar Stream in the Solar Vicinity. *Nature Astronomy* (2020)/
ARXIV:1907.07190
- 13†) Bryan Ostdiek, **Lina Necib**, Timothy Cohen,
Marat Freytsis, Mariangela Lisanti, Shea Garrison-Kimmel,
Andrew Wetzel, Robyn E. Sanderson, Philip F. Hopkins.
Cataloging Accreted Stars within Gaia DR2 using Deep Learning. *A&A* **636** A75/
ARXIV:1907.06652
- 12†) **Lina Necib**, Mariangela Lisanti, Shea Garrison-Kimmel,
Andrew Wetzel, Robyn Sanderson, Philip F. Hopkins,
Claude-André Faucher-Giguère, Dušan Kereš.
Under the Firelight: Stellar Tracers of the Local Dark Matter Velocity Distribution in the Milky Way. *ApJ* **883** no.1, 27/
ARXIV:1810.12301
- 11†) **Lina Necib**, Mariangela Lisanti, Vasily Bolokurov.
Inferred Evidence for Dark Matter Kinematic Substructure with SDSS-Gaia. *ApJ* **874** no.3, 22/
ARXIV:1807.02519
- 10) Frédéric A. Dreyer‡, **Lina Necib**, Gregory Soyez, Jesse Thaler.
Recursive Softdrop. *JHEP* **1806** 093/ARXIV:1804.03657
- 9) Jonah Herzog-Arbeitman, Mariangela Lisanti, **Lina Necib**‡.
The Metal-Poor Stellar Halo in RAVE-TGAS and its Implications for the Velocity Distribution of Dark Matter. *JCAP* **1804** 052/ARXIV:1708.03635
- 8) Gordan Krnjaic‡, Pedro A. N. Machado, **Lina Necib**.
Distorted Neutrino Oscillations From Ultralight Scalar Dark Matter. *Phys.Rev. D* **97** no.7, 075017 /
ARXIV:1705.06740
- 7) Jonah Herzog-Arbeitman, Mariangela Lisanti, Piero Madau, **Lina Necib**‡.
Empirical Determination of Dark Matter Velocities using Metal-Poor Stars. *Phys.Rev.Lett* **120** no.4, 041102/
ARXIV:1704.04499
- 6†) **Lina Necib**, Jarrett Moon, Taritree Wongjirad, Janet Conrad.
Boosted Dark Matter at Neutrino Experiments. *Phys.Rev. D* **95** no.7, 075018/
ARXIV:1610.03486

- 5) Ian Mould, **Lina Necib**[‡], Jesse Thaler.
New Angles on Energy Correlation Functions. *JHEP* **1612** 153/
ARXIV:1609.07483
- 4) Mariangela Lisanti, Siddharth Mishra-Sharma[‡], **Lina Necib**, Benjamin R. Safdi.
Deciphering Contributions to the Extragalactic Gamma-Ray Background from 2 GeV to 2 TeV. *ApJ* **832** no.2, 117/
ARXIV:1606.04101
- 3) Nicolas Bernal, **Lina Necib**[‡], Tracy R. Slatyer.
Spherical Cows in Dark Matter Indirect Detection. *JCAP* **1612** no. 030/
ARXIV:1606.00433
- 2) Nayara Fonseca, **Lina Necib**[‡], Jesse Thaler.
Dark Matter, Shared Asymmetries, and Galactic Gamma Ray Signals. *JCAP* **1602**, no. 052/
ARXIV:1507.08295
- 1) Kaustubh Agashe, Yanou Cui, **Lina Necib**[‡], Jesse Thaler.
(In)direct Detection of Boosted Dark Matter. *JCAP* **1410**, no. 062/
ARXIV:1405.7370

N-TH AUTHOR PAPERS

- 5) Anirudh Chiti, Anna Frebel, Joshua D. Simon, Denis Erkal, Laura J. Chang, **Lina Necib**, Alexander P. Ji, Helmut Jerjen, Dongwon Kim, John E. Norris
An Extended Halo Around an Ancient Dwarf Galaxy. ARXIV:2012.02309
- 4) Carine Babusiaux, Maria Bergemann, Adam Burgasser, ..., **Lina Necib**, et al.
The Detailed Science Case for the Maunakea Spectroscopic Explorer. ARXIV:1904.04907
- 3) Keith Bechtol, Alex Drlica-Wagner, Kevork N. Abazajian, ..., **Lina Necib**, et al.
Dark Matter Science in the Era of LSST. ARXIV:1903.04425
- 2) Keith Bechtol, Adam S. Bolton, Jo Bovy, ..., **Lina Necib**, et al.
Astrophysical Tests of Dark Matter with Maunakea Spectroscopic Explorer. ARXIV:1903.03155
- 1) Alex Drlica-Wagner, Yao-Yuan Mao, ..., **Lina Necib**, et al.
Probing the Fundamental Nature of Dark Matter with the Large Synoptic Survey Telescope ARXIV:1902.01055

COLLOQUIA

- Dark Matter in the Era of *Gaia* OCTOBER 2020
University of Indiana Physics Colloquium
- Dark Matter in the Era of *Gaia* SEPTEMBER 2020
Emory University Physics Colloquium
- Dark Matter in the Era of *Gaia* JULY 2020
KIPAC Stanford Astrophysics Colloquium
- Dark Matter in the Era of *Gaia* DECEMBER 2019
Carnegie Observatories Colloquium
- Dark Matter in the Era of *Gaia* SEPTEMBER 2019
MIT Astronomy Colloquium
- Dark Matter in the Era of *Gaia* MAY 2019
California Institute of Technology

SEMINAR TALKS

Dark Matter in the Era of <i>Gaia</i> <i>Tsung-Dao Lee Institute</i>	DECEMBER 2020
Dark Matter in the Era of <i>Gaia</i> <i>Colorado University, Boulder</i>	OCTOBER 2020
Tracing Dark Matter with Stars <i>Virginia Tech</i>	SEPTEMBER 2020
Tracing Dark Matter with Stars <i>Fermilab</i>	JULY 2020
Dark Matter in the Era of <i>Gaia</i> <i>University of California Irvine</i>	APRIL 2020
Dark Matter in the Era of <i>Gaia</i> <i>University of Surrey</i>	JANUARY 2020
Dark Matter in the Era of <i>Gaia</i> <i>Perimeter Institute</i>	OCTOBER 2019
Dark Matter in the Era of <i>Gaia</i> <i>Harvard University</i>	OCTOBER 2019
Dark Matter in the Era of <i>Gaia</i> <i>Boston University</i>	SEPTEMBER 2019
Properties Dark Matter in the Era of <i>Gaia</i> <i>LHC Results Forum</i>	SEPTEMBER 2019
Dark Matter in the Era of <i>Gaia</i> <i>Fermilab</i>	SEPTEMBER 2019
Dark Matter in the Era of <i>Gaia</i> <i>Texas A&M</i>	SEPTEMBER 2019
Dark Matter in the Era of <i>Gaia</i> <i>Ohio State University</i>	JULY 2019
Dark Matter in the Era of <i>Gaia</i> <i>Los Alamos National Laboratory</i>	MAY 2019
The Stellar Local Velocity Distribution and its Implications for Dark Matter <i>California Institute of Technology</i>	APRIL 2019
Dark Matter in Disequilibrium and Implications for Direct Detection <i>University of California Irvine</i>	MARCH 2019
Dark Matter in Disequilibrium and Implications for Direct Detection <i>SLAC</i>	JANUARY 2019
Dark Matter in Disequilibrium and Implications for Direct Detection <i>University of California Santa Barbara</i>	DECEMBER 2018

Dark Matter in Disequilibrium and Implications for Direct Detection <i>John's Hopkins University</i>	DECEMBER 2018
Dark Matter in Disequilibrium and Implications for Direct Detection <i>University of Maryland</i>	DECEMBER 2018
Dark Matter in Disequilibrium and Implications for Direct Detection <i>KICP, University of Chicago</i>	NOVEMBER 2018
Dark Matter in Disequilibrium and Implications for Direct Detection <i>Lawrence Berkeley National Laboratory</i>	NOVEMBER 2018
Dark Matter in Disequilibrium and Implications for Direct Detection <i>Rutgers University</i>	OCTOBER 2018
Dark Matter in Disequilibrium and Implications for Direct Detection <i>University of Kentucky</i>	OCTOBER 2018
Dark Matter in Disequilibrium and Implications for Direct Detection <i>SuperCDMS Collaboration</i>	SEPTEMBER 2018
Dark Matter in Disequilibrium: The Velocity Distribution <i>Fermilab</i>	JUNE 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>University of California San Diego</i>	MAY 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>Princeton University</i>	MARCH 2018
Boosted Dark Matter in Neutrino Experiments <i>Brookhaven National Laboratory</i>	MARCH 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>Brookhaven National Laboratory</i>	MARCH 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>New York University</i>	MARCH 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>University of Michigan Ann Arbor</i>	MARCH 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>Rutgers University</i>	FEBRUARY 2018
Empirical Determination of the Dark Matter Velocity Distribution <i>University of California Irvine</i>	DECEMBER 2017
Empirical Determination of the Dark Matter Velocity Distribution <i>University of Oregon</i>	NOVEMBER 2017
Empirical Determination of the Dark Matter Velocity Distribution <i>Boston University</i>	NOVEMBER 2017
Empirical Determination of the Dark Matter Velocity Distribution <i>University of Illinois Urbana-Champaign</i>	OCTOBER 2017

Empirical Determination of the Dark Matter Velocity Distribution <i>University of California Santa Barbara</i>	OCTOBER 2017
Empirical Determination of the Dark Matter Velocity Distribution <i>California Institute of Technology</i>	OCTOBER 2017
Using Simulations to Improve Dark Matter Searches <i>Harvard University</i>	FEBRUARY 2017
Spherical Cows of Dark Matter Indirect Detection <i>University of California Berkeley</i>	NOVEMBER 2016
Spherical Cows of Dark Matter Indirect Detection <i>Harvard University</i>	OCTOBER 2016
Boosted Dark Matter in Neutrino Experiments <i>Harvard University</i>	OCTOBER 2016
Spherical Cows of Dark Matter Indirect Detection <i>Cornell University</i>	OCTOBER 2016
Spherical Cows of Dark Matter Indirect Detection <i>Princeton University</i>	SEPTEMBER 2016
Boosted Dark Matter in Neutrino Experiments <i>Tufts University</i>	JUNE 2016
(In)Direct Detection of Boosted Dark Matter <i>SLAC</i>	APRIL 2016

INVITED CONFERENCE TALKS

Dark Matter in the Era of <i>Gaia</i> <i>Exploring the Dark Side of the Universe, Pointe-A-Pitre, Guadeloupe</i>	MARCH 2020 <u>PLENARY-REMOTE</u>
Dark Matter in the Era of <i>Gaia</i> <i>Theory Meets Experiment, Quy Nhon, Vietnam</i>	JANUARY 2020 <u>PLENARY</u>
Dark Matter in the Era of <i>Gaia</i> <i>Searching for new physics - Leaving no stone unturned!, Salt Lake City, UT, USA</i>	AUGUST 2019
Dark Matter in the Era of <i>Gaia</i> <i>234th AAS Meeting, Saint Louis, MO, USA</i>	JUNE 2019
The Stellar Local Velocity Distribution and its Implications for Dark Matter <i>In the Balance: Stasis and Disequilibrium in the Milky Way, KITP, Santa Barbara, CA, USA</i>	APRIL 2019
Dark Matter in Disequilibrium and its Implications on Direct Detection <i>Interplay between Particle and Astroparticle Physics, Cincinnati, OH, USA</i>	OCTOBER 2018
Reconstructing the Dark Matter Velocity Distribution from the Stars <i>Galaxy Formation and Evolution in Southern California, Pasadena, CA, USA</i>	AUGUST 2018
Dark Matter in Disequilibrium and its Implications on Direct Detection <i>Identification of Dark Matter, Providence, RI, USA</i>	JULY 2018 <u>PLENARY</u>

Dark Matter in Disequilibrium: The Velocity Distribution
Near Field Cosmology Workshop, Chicago, IL, USA JUNE 2018

Light Dark Matter at Neutrino Detectors
Light Dark World, Pittsburgh, PA, USA OCTOBER 2017

CONFERENCE TALKS

Empirical Determination of the Dark Matter Velocity Distribution
UCLA Dark Matter, Los Angeles, CA, USA FEBRUARY 2018

Empirical Determination of Dark Matter Velocity Distribution
Dark Matter of Southern California, Pasadena, CA, USA SEPTEMBER 2017

Empirical Determination of Dark Matter Velocity Distribution
TeVPA, Columbus, Ohio, USA AUGUST 2017

Constructing Stable Observables with Energy Correlation Functions
Jet Substructure "Planning for the Future", Fermilab, USA NOVEMBER 2016

Spherical Cows of Dark Matter Indirect Detection
TeVPA, CERN, Switzerland SEPTEMBER 2016

Boosted Dark Matter in Neutrino Experiments
Dark Side of the Universe, Bergen, Norway JULY 2016

Dark Matter, Shared Asymmetries, and Galactic Gamma Ray Signals
Pheno Symposium, Pittsburgh, USA MAY 2016

(In)Direct Detection of Boosted Dark Matter
TAUP, Torino, Italy SEPTEMBER 2015

PUBLIC TALKS

Chasing Dark Matter with the *Gaia* Enceladus
Astronomy on TAP, Santa Barbara, CA, USA APRIL 2019

POSTERS

Energy-Dependent Analysis of Unresolved Point Sources
Fermi Symposium, Washington DC., USA NOVEMBER 2015

PROCEEDINGS

Kaustubh Agashe, Yanou Cui, Lina Necib, Jesse Thaler
(In)Direct Detection of Boosted Dark Matter PROCEEDINGS FOR TAUP 2015
J.Phys.Conf.Ser. 718 (2016) no.4, 042041

TELESCOPE AND COMPUTING ALLOCATIONS

Magellan/MIKE
High-resolution spectroscopy, 4 nights (PI) SEMESTER 2020B

Magellan/MIKE
High-resolution spectroscopy, 2 nights (co-PI) SEMESTER 2020A
CANCELED, COVID-19

Keck/HIRES
High-resolution spectroscopy, 1 night (PI) SEMESTER 2020A

TEACHING EXPERIENCE: TEACHING ASSISTANT

Supersymmetric Quantum Field Theory, 8.831	<i>Spring 2017</i>
Quantum Mechanics I, 8.04	<i>Fall 2013, 2016</i>
Physics I, 8.01L	<i>Fall 2015</i>
Graduate Quantum Mechanics, 8.231	<i>Fall 2014</i>
Quantum Mechanics III, 8.06	<i>Spring 2014, 2015, 2016</i>

OUTREACH

Interview with The Cosmic Companion	<i>07/28/2020</i>
Skype with a Scientist	<i>Spring 2020</i>
Mindscape Podcast with Sean Carroll	<i>05/11/2020</i>
Astronomy on TAP, Santa Barbara, CA	<i>04/03/2019</i>
High school summer research at Caltech	<i>Summer 2018</i>
“Science on Saturday”, Cambridge, MA	<i>02/07/2015</i>

SERVICE

Referee for Journal of Cosmology and Astroparticle Physics (JCAP)	<i>Since 2019</i>
Referee for Monthly Notices of the Royal Astronomical Society (MNRS)	<i>Since 2018</i>
Referee for Physics Review Letters (PRL)	<i>Since 2018</i>
Referee for Journal of High Energy Physics (JHEP)	<i>Since 2018</i>
Referee for Physics Review D (PRD)	<i>Since 2017</i>
Beyond the Standard Model Journal Club Organizer	<i>2015 - 2017</i>
Graduate Student Lunch Organizer	<i>2014 - 2015</i>
“Science on Saturday” event Organizer	<i>02/07/2015</i>