

## CHEN SUN

School of Physics and Astronomy, Tel-Aviv University, Tel-Aviv 69978, Israel | Skype: riowzl | sunchen `AT` gmail.com

### RESEARCH INTERESTS

#### Phenomenology:

- Cosmological constraints of axion-like particles,
- Stellar cooling constraints on light DM,
- Kinematic constraints on ultralight DM,
- Gravitational wave from BSM in binary mergers,
- Machine learning in CMB,
- Neutrino phenomenology,

#### Theory:

- Extra dimension model building
- Left-right symmetric model,
- Non-commutative geometry,

### RESEARCH EXPERIENCE

Tel Aviv University

**Postdoc**

2019/09 – present

Brown University/ KITPC Fellow

**Joint Postdoc**

2018/09 – 2019/09

Dartmouth College/ KITPC Fellow

**Joint Postdoc**

2017/08 – 2018/08

Virginia Tech, Blacksburg, VA

**Ph.D.** in Physics

2013/08 – 2017/05

Dissertation: Constraining New Physics with Colliders and Neutrinos

Advisor: Tatsu Takeuchi

### PUBLICATIONS ([ARXIV.ORG/A/SUN\\_C\\_1](https://arxiv.org/a/sun_c_1))

#### Novel constraints of light dark sector,

- 1 Challenges for an axion explanation of the muon g-2 measurement [arXiv: 2104.03267](https://arxiv.org/abs/2104.03267)
- 2 Axions: From magnetars and neutron star mergers to beam dumps and BECs [arXiv: 2102.12503](https://arxiv.org/abs/2102.12503)
- 3 Constraints on Axions from Cosmic Distance Measurements [arXiv: 2011.05993](https://arxiv.org/abs/2011.05993)
- 4 Two-Scalar Bose-Einstein Condensates: From Stars to Galaxies [arXiv: 2010.15977](https://arxiv.org/abs/2010.15977)

#### Gravitational wave probe of light dark sector,

- 5 Probing Boson Stars with Extreme Mass Ratio Inspirals [arXiv:1904.07871](https://arxiv.org/abs/1904.07871)  
JCAP 1909 (2019) no.09, 032
- 6 *Boson Star from Repulsive Light Scalars and Gravitational Waves* [arXiv: 1810.01420](https://arxiv.org/abs/1810.01420)  
JCAP 1904 (2019) no.04, 008
- 7 *Gravitational Radiation Background from Boson Star Binaries* [arXiv:1802.08259](https://arxiv.org/abs/1802.08259)  
Phys.Lett. B783 (2018) 158-162
- 8 *Hidden-Sector Spectroscopy with Gravitational Waves from Binary Neutron Stars* [arXiv:1711.02096](https://arxiv.org/abs/1711.02096)  
Astrophys.J. 858 (2018) no.1, L2

#### Neutrino probe of BSM,

- 9 *Constraints on Non-Standard Neutrino Interactions from Borexino Phase-II* [arXiv: 1905.03512](#)  
submitted to JHEP
- 10 *A new solar neutrino channel for grand-unification monopole searches* [arXiv:1803.02835](#)  
JCAP 1810 (2018) no.10, 034
- 11 *Supernova Physics at DUNE*  
Summary of workshop "Supernova Physics at DUNE" held at Virginia Tech. Conference: C16-03-11.1. [arXiv:1608.07853](#)

#### Noncommutativity, geometry, and colliders,

- 12 *B-decay anomalies and scalar leptoquarks in unified Pati-Salam models from noncommutative geometry*  
JHEP 1809 (2018) 117 [arXiv:1804.05844](#)
- 13 *Pati-Salam Unification from Non-commutative Geometry and the TeV-scale  $W_R$  boson,*  
Int. J. Mod. Phys. A31 (2016) 1550223. [arXiv: 1509.01606](#)
- 14 *On the Physics of the Minimal Length: The Question of Gauge Invariance*  
J. Mod. Phys. A 31, 1630012 (2016). [arXiv:1602.07752](#)
- 15 *The 750 GeV diphoton excess in unified  $SU(2)_L \times SU(2)_R \times SU(4)$  models from noncommutative geometry*  
Mod. Phys. Lett. A 31 (2016) no. 18, 1650101. [arXiv:1603.01756](#)
- 16 *Observable Effects of Quantum Gravity*  
Received honorable mention in the Gravity Research Foundation 2016 Awards for Essays on Gravitation. [arXiv:1605.04361](#)
- 17 *The Higgs Mass, Superconnections and the TeV-scale Left-Right Symmetric Model*  
Phys. Rev. D 91, 045020 (2015). [arXiv:1409.7574](#)

#### INVITED TALKS

Constraints on Axions from Cosmic Distance Measurements XIV Workshop on Interconnections between Particle Physics and Cosmology Hebrew University	May 2021 May 2021
Challenges for an axion explanation of the muon $g-2$ measurement Phenomenology 2021 Symposium	May 2021
Gravitational Wave Signatures of Beyond Standard Model Physics U. Oklahoma	May 2019
Constraints on Non-Standard Neutrino Interactions from Borexino Phase-II Neutrino-Electron Scattering at Low Energies Workshop, at UMass Amherst	Apr 2019
Boson Star from Repulsive Scalars, at LIGO and LISA Signals of Dark Matter in its Natural Habitat Workshop at TRIUMF Phenomenology 2019 Symposium	Feb 2019 May 2019
Boson Star from Repulsive Light Scalars and Gravitational Waves MIT Stanford UC Irvine University of Utah	Oct 2018 Nov 2018 Nov 2018 Nov 2018
Particle Phenomenology in the Era of Gravitational Wave Astronomy Carleton University Queen's University Perimeter Institute McGill University	Oct 2018 Oct 2018 Oct 2018 Oct 2018
New Astrophysical Probes of Beyond SM Physics North-East Cosmology Workshop 2018, McGill University	March 2018

<i>Gravitational Wave Cosmology &amp; Particle Physics</i> Brown University	December 2017
<i>The Limits of Dark Matter from Electroweak Symmetry Breaking</i> New England Theoretical Cosmology and Gravity Workshop, MIT	October 2017
<i>Constraints on light <math>Z'</math> models with flavor changing couplings</i> Baryon & Lepton Number Violation 2017, Case Western Reserve University	May 2017
<i>750 GeV diphoton excess in unified Pati-Salam models from NCG</i> Phenomenology 2016 Symposium, University of Pittsburgh	May 2016
<i>Rethinking Gauge Theory through Connes' Noncommutative Geometry</i> SPOCK meeting, University of Cincinnati String Group Seminar, Department of Physics, Virginia Tech Duke Regional String Meeting, Duke University NNN15 and UD2 Workshop, Stony Brook University (Poster)	August 2015 October 2015 October 2015 October 2015
<i>The Standard Model Hypercharge: From Superconnection to Noncommutative Geometry</i> Phenomenology 2015 Symposium, University of Pittsburgh	May 2015
<i>Constraining the Interactions of the Neutrino with OscSNS</i> Phenomenology 2013 Symposium, University of Pittsburgh HUGS summer school, Jefferson Lab	May 2013 June 2013

## CONFERENCE AND SCHOOLS

Sterile Neutrinos at the Crossroads, Virginia Tech, Blacksburg, VA	September 2011
The 78th Annual Meeting of the Southeastern Section of the APS, Roanoke, VA	October 2011
Phenomenology 2012 Symposium at University of Pittsburgh, Pittsburgh, PA	May 2012
Physics with a Positive Cosmological Constant Workshop, Penn State, University Park, PA	May 2012
International Neutrino Summer School (INSS) at Virginia Tech, Blacksburg, VA	July 2012
SLAC Summer Institute, Menlo Park, CA	July 2012
Phenomenology 2013 Symposium at University of Pittsburgh, Pittsburgh, PA (talk presented)	May 2013
Hampton University Graduate Studies (HUGS) 2013, at Jefferson Lab, Newport News, VA (talk presented)	May 2013
2013 CERN-Fermilab HCP Summer School, at CERN, Geneva, Switzerland	August 2013
2014 CTEQ Summer School at Peking University, Beijing, China	July 2014
ESI workshop: The interrelation between mathematical physics, number theory and noncommutative geometry, Vienna, Austria	March 2015
Phenomenology 2015 Symposium at University of Pittsburgh, Pittsburgh, PA (talk presented)	May 2015
SPOCK meeting, University of Cincinnati, Cincinnati, OH (talk presented)	August, 2015
Duke Regional String Meeting, Duke University, Durham, NC (talk presented)	October, 2015
NNN15 and UD2, Stony Brook University, Stony Brook, NY (poster presented)	October, 2015
First PIKIO meeting at University of Cincinnati, Cincinnati, OH	February, 2016
Supernova Physics at DUNE Workshop, Virginia Tech, Blacksburg, VA	March, 2016
Phenomenology 2016 Symposium, University of Pittsburgh, Pittsburgh, PA (talk presented)	May, 2016
40 <sup>th</sup> Johns Hopkins Workshop, Baltimore, MD	May, 2016
Second PIKIO meeting at University of Ohio State University, Columbus, OH	September, 2016
F-theory Workshop, Virginia Tech, Blacksburg, VA	October, 2016
SPOCK meeting at University of Cincinnati, Cincinnati, OH	October, 2016
Baryon & Lepton Number Violation 2017, Case Western Reserve University (talk presented)	May 2017
New England Theoretical Cosmology and Gravity Workshop, MIT (talk presented)	October 2017
North-East Cosmology Workshop 2018, McGill University (talk presented)	March 2018
Standard Model at 50, Case Western Reserve University	June 2018
Novel Ideas for Dark Matter 2019, Princeton	January 2019

Signals of Dark Matter in its Natural Habitat Workshop, TRIUMF (talk presented)	Feb 2019
Neutrino-Electron Scattering at Low Energies Workshop, UMass Amherst (talk presented)	Apr 2019
Phenomenology 2019 Symposium, Pittsburgh (talk presented)	May 2019
Israel Physical Society Conference 2020	Feb 2020
Phenomenology 2020 Symposium, Pittsburgh	May 2020
Israel Physical Society Conference 2021	Feb 2021
Phenomenology 2020 Symposium, Pittsburgh (talk presented)	May 2021
Interconnections between Particle Physics and Cosmology PPC 2021 (talk presented)	May 2021

## TEACHING EXPERIENCE

Virginia Tech, Blacksburg, VA	
<b>Teaching Assistant</b> – to Professor Leo Piilonen in “Electromagnetism”	2016
Covered lectures in absence of Prof. Piilonen and administered all grades and tests.	
<b>Teaching Assistant</b> – to Professor Mark Pitt in “Electromagnetism”	2015
Graded all written work.	

## AWARDS AND MEMBERSHIPS

Israel Academy of Sciences and Humanities (IASH) Foreign Postdoctoral Fellowship	2019 – 2021
Chinese Postdoctoral Foundation Fellowship, National Award	2017 – 2019
Clayton Williams Graduate Fellowship, Departmental Award	2015 – 2016
Sigma Xi Outstanding PhD Research Award	2015
Member of Sigma Pi Sigma, The Physics Honor Society	2011 – Present
Chinese National Fellowship	2008

## REFERENCES

Jiji Fan	Department of Physics, Brown University, Providence, RI 02912 Phone: +1-401-863-2641 Email: jiji_fan@brown.edu
Tim Tait	Department of Physics and Astronomy, UC Irvine, Irvine, CA 92697 Phone: +1-949-824-8304 Email: ttait@uci.edu
Tatsu Takeuchi	Department of Physics, Virginia Tech, Blacksburg, VA 24061-0435 Phone: +1-540-231-5333 Email: takeuchi@vt.edu
Tomer Volansky	Raymond and Beverly Sackler School of Physics and Astronomy, Tel-Aviv University, Tel-Aviv 69978, Phone: +972-3-6407026 Email: tomerv@post.tau.ac.il