James A. Unwin **January 2022**

Contact

Department of Physics,
University of Illinois at Chicago,
Chicago, IL 60607, USA.

✉ *unwin@uic.edu*
http://unwin.people.uic.edu
☎ (+1) 217 377 8526

Academic Positions

Assistant Professor. 2018-
University of Illinois at Chicago, USA.

Research Assistant Professor. 2015-18
University of Illinois at Chicago, USA.

Postdoctoral Researcher. 2013-15
University of Notre Dame, USA.

Education

Doctorate of Philosophy (DPhil) 2013
University of Oxford, UK.
Primary Advisor: Prof. John March-Russell, (Rudolf Peierls Centre For Theoretical Physics).
Secondary Advisor: Prof. Philip Candelas, FRS (Mathematical Institute)

Master of Mathematics and Physics (MMath&Phys). 2007
University of Manchester, UK. First Class Honours (1:1). Ranked 1st in Honours Group.

Visiting Positions

Department of Physics, University of Oxford.	Jan-Aug. 2023
UC Berkeley & LBNL	Aug-Dec. 2022.
UC Berkeley & LBNL & Mathematical Sciences Research Institute (MSRI).	Aug-Dec. 2019
SCGP, Stony Brook University.	Jan-Aug. 2019
Department of Physics, University of Oxford.	Aug-Dec. 2018
Deutsches Elektronen-Synchrotron (DESY), Germany.	Summer 2017

Awards, Grants, & Distinctions

12. **Distinguished Academic Visitor**, Queen's College, University of Oxford. 2023
11. **Fellow**, Honors College, University of Illinois at Chicago. 2021
10. **Member**, Mathematical Sciences Research Institute (MSRI), Berkeley. 2019
9. **Visiting Assistant Professor** (with Teaching Buyout), SCGP, Stony Brook. 2019
8. **Visiting Fellow**, New College, Oxford. 2018
7. **Humboldt Research Fellowship**, Alexander von Humboldt Foundation. 2017-18
6. **Charterhouse European Scholarship**, University of Oxford. 2012-13
5. **Vice Chancellors' Fund Award**, University of Oxford. 2012-13
4. **Dean of Graduate's Award**, Pembroke College, Oxford. 2008-13
3. **EPSRC Doctoral Scholarship**, Mathematical Institute, Oxford. 2008-11
2. **Graduate Scholarship**, Pembroke College, University of Oxford. 2007-10
1. **Esson Bequest Bursary**, Mathematical Institute, Oxford. 2012-13

Publications

36. *Electroweak Symmetry Non-Restoration from Dark Matter,*
Oleksii Matsedonskyi, James Unwin, & Qingyun Wang, JHEP 12 (2021) 167 arXiv:2107.07560.
35. *Decoupling of Asymmetric Dark Matter during an Early Matter Dominated Era,*
Prolay Chanda and James Unwin, JCAP 06 (2021) 032, arXiv:2102.02313.
34. *The First Three Seconds: A Review of Possible Expansion Histories of the Early Universe,*
R. Allahverdi *et al.*, Open J.Astrophys. 4 (2021), arXiv:2006.16182.

33. *What if Planet 9 is a Primordial Black Hole?*
Jakub Scholtz and James Unwin,
Phys. Rev. Lett. 125, (2020) 051103 (Editors' Suggestion) arXiv:1909.11090.

32. *Reviving Z and Higgs Mediated Dark Matter Models in Matter Dominated Freeze-out,*
Prolay Chanda, Saleh Hamdan, and James Unwin,
JCAP **01** (2020) 034, arXiv:1911.02616.

31. *Ultraviolet Freeze-in and Non-Standard Cosmologies,*
Nicolás Bernal, Fatemeh Elahi, Carlos Maldonado,
and James Unwin, JCAP **11** (2019) 026, arXiv:1909.07992.

30. *Establishing the Dark Matter Relic Density in an Era of Particle Decays,*
Carlos Maldonado and James Unwin, JCAP **06** (2019) 037, arXiv:1902.10746.

29. *Protecting the Axion with Local Baryon Number,*
Michael Duerr, Kai Schmidt-Hoberg and James Unwin,
Phys. Lett. B **780** (2018) 553, arXiv:1712.01841.

28. *Dark Matter Freeze-out During Matter Domination*,
Saleh Hamdan and James Unwin,
Mod. Phys. Lett. A **33** (2018) no.29, 1850181 arXiv:1710.03758.

27. *Symmetric and Asymmetric Reheating*,
Edward Hardy and James Unwin,
JHEP **1709** (2017) 113, arXiv:1703.07642.

26. *Superheavy Thermal Dark Matter and Primordial Asymmetries*,
Joseph Bramante and James Unwin,
JHEP **1702** (2017) 119, arXiv:1701.05859.

25. *Cores in Dwarf Galaxies from Fermi Repulsion*,
Lisa Randall, Jakub Scholtz, and James Unwin,
Monthly Notices of the Royal Astronomical Society (2017) 467 (2): 1515, arXiv:1611.04590.

24. *Axial Vector Z' and Anomaly Cancellation*,
Ahmed Ismail, Wai-Yee Keung, Kuo-Hsing Tsao, and James Unwin,
Nucl. Phys. B. **918** (2017) 220-244, arXiv:1609.02188.

23. *Flooded Dark Matter and S Level Rise*,
Lisa Randall, Jakub Scholtz, and James Unwin,
JHEP **1603** (2016) 011, arXiv:1509.08477.

22. *On Baryogenesis from a Complex Inflaton,*
James Unwin, Symmetry (2021) 13 (12): 2449, arXiv:1503.06806.

21. *UltraViolet Freeze-in*,
Fatemeh Elahi, Chris Kolda, and James Unwin,
JHEP **1503** (2015) 048, arXiv:1410.6157.

20. *Fitting the Galactic Center γ-Ray Excess with Cascade Annihilations*,
Adam Martin, Jessie Shelton, and James Unwin,
Phys. Rev. D **90** (2014), 103513, arXiv:1405.0272.

19. *Towards Cogenesis via Asymmetric Freeze-in: The χ who came-in from the cold*,
James Unwin, JHEP **1410** (2014) 190, arXiv:1406.3027.

18. *Precision Unification and Proton Decay in F-theory GUTs with High Scale Supersymmetry*,
Arthur Hebecker and James Unwin,
JHEP **1409** (2014) 125, arXiv:1405.2930.

17. *X-ray lines from R-parity violating decays of keV sparticles*,
Chris Kolda and James Unwin,
Phys. Rev. D **90** (2014), 023535, arXiv:1403.5580.

16. *Annihilation Signals from Asymmetric Dark Matter,*
Edward Hardy, Robert Lasenby, and James Unwin,
JHEP **1407** (2014) 049, arXiv:1402.4500.

15. *On Connections Between Dark Matter and the Baryon Asymmetry*,
James A. Unwin, DPhil Thesis, University of Oxford (2013).

14. *The impact of heavy-quark loops on LHC monojet searches*,
Ulrich Haisch, Felix Kahlhoefer, and James Unwin,
JHEP **1307** (2013) 125, arXiv:1208.4605.

13. Exodus: Hidden origin of dark matter and baryons,
James Unwin, JHEP **1306** (2013) 090, arXiv:1212.1425.

12. *R-symmetric high scale supersymmetry*,
James Unwin, Phys. Rev. D **86** (2012) 095002, arXiv:1210.4936.

11. *Precision unification in λSUSY with a 125 GeV Higgs*,
Edward Hardy, John March-Russell, and James Unwin,
JHEP **1210** (2012) 072, arXiv:1207.1435.

10. *Closing in on asymmetric dark matter I: Model independent limits on interactions with quarks*,
John March-Russell, James Unwin, and Stephen M. West,
JHEP **1208** (2012) 029, arXiv:1203.4854.

9. *Vacuum stability and the Cholesky decomposition*,
James Unwin, EPJC **71** (2011) 1663, arXiv:1102.2896.

Interdisciplinary Publications

8. *COVID-19 Forecasts via Stock Market Indicators,*
Yi Liang and James Unwin, arXiv:2112.06393, [q-bio.pe].

7. *The Impact of Race on COVID-19 Infection in New York City,*
Yunseo Choi and James Unwin, arXiv:2007.04743 [q-bio.pe].

6. *All-Pay Auctions as Models for Military Annexation,*
Benjamin Kang and James Unwin, arXiv:2002.02599 [econ.TH].

5. *All-Pay Auctions with Different Forfeit Functions,*
Benjamin Kang and James Unwin, arXiv:2002.03492 [econ.TH].

4. *Markov Chain Migration Model Applied to Refugee Data*,
Vincent Huang and James Unwin,
IMA Journal of Applied Mathematics Volume 85, Issue 6 (2020) pp. 892-912,
arXiv:1903.08255 [physics.soc-ph].

3. *Sonia Kovalevsky Days: The potential to inspire*,
Laura Schaposnik and James Unwin,
AWM Newsletter, volume 49, no. 5. 2019, arXiv:1906.03121 [physics.ed-ph].

2. *Lattice Studies of Gerrymandering Strategies*,
Kyle Gatesman and James Unwin,
Political Analysis, 29(2), 167-192. arXiv:1808.02826 [physics.soc-ph].

1. *The Phone Walkers: A study of human dependence on inactive mobile devices*,
Laura Schaposnik and James Unwin,
Behaviour, Volume 155, Issue 5, (2018) 389 arXiv:1804.08753 [physics.soc-ph].

Press

- 'What if Planet 9 is a Primordial Black Hole?' Phys. Rev. Lett. 125, (2020) 051103.
  - **Media Articles:** Work highlighted in 100+ media source, including:

The New York Times	Science	Nature
The Guardian (UK)	MIT Technology Review	ABC News
BBC	Forbes	La Repubblica (Italy)
Physics (APS)	Gizmodo (9/27/2019)	Esquire (Italy)
Live Science	Fox News (8/30/2019)	Salon
Vice	Fox News (5/8/2020)	The Sun (UK)
Der Standard (Germany)	Astronomy	News Week
The Express	Daily Star (UK)	Sky News
The Mirror (UK)	Liberation (France)	Mashable
Discovery Magazine	Scientias (Netherlands)	PBS
The Metro (UK)	New York Post	Phys.org
Physics World (IOP)	Science (Top Stories 2019)	Business Insider

  - **Altmetric:** The paper has an Altmetric score over 2100 making it the 2nd most discussed article ever in the Physical Review Letters (the most prestigious physics journal).
  - **Documentary:** I appear in a mini-documentary by Tech Insider (250k youtube views): Why astrophysicists think there's a black hole in our solar system.
  - **Youtube:** There are also multiple semi-professional youtube videos (some I appear in):

    Planet 9 Could Be a Black Hole?! || SciShow News with 533k views.

    Is Planet 9 a Black Hole? With Dr. Jakub Scholtz and Dr. James Unwin with 235k views.

    Scientists Wonder If Planet 9 Could Be a Primordial Black Hole with 231k views.

    What if Planet 9 was a primordial black hole? Could we detect it? with 75k views.

    Is Planet Nine a Black Hole? with 47k views.

- 'The Phone Walkers: A study of human dependence on inactive mobile devices', Behaviour, Vol. 155, Issue 5, (2018) 389, was highlighted in 15+ media sources, including:

Chicago Tribune	Süddeutsche Zeitung	Workplace Insight
MIT Technology Review	The Week	Fast Company
The Atlantic	The Times of India	Cronica (Argentina)

- 'Flooded Dark Matter and S Level Rise', JHEP 1603 (2016) 011 featured in The Chronicle Review, The Chronicle of Higher Education, *In Praise of Jargon*.

PhD Students

- Qingyun Wang, current PhD student (UIC). 2020-
- Prolay Chanda, current PhD student (UIC). 2017-
- Saleh Hamdan, PhD defended July 2018 (UIC), now a postdoc in medical physics. 2016-18

Research Students

- Alex Liang, MIT-Primes high school student (accepted for undergraduate at MIT). 2021-22
- Yunseo Choi, MIT-Primes high school student (now UG at Harvard). 2020-21
- Ben Kang, MIT-Primes high school student (now UG at MIT). 2019-20
- Carlos Maldonado, Visiting PhD student from Universidad de Santiago de Chile. 2018-19
- Vincent Huang, MIT-Primes high school student (now UG at MIT). 2018-19
- Kyle Gatesman, MIT-Primes high school student (now UG at Johns Hopkins). 2017-18

UIC Teaching

- PHYS112 Astronomy and the Universe (1 Semester) 2021
- PHYS561 Statistical Mechanics (1 Semester) 2020
- PHYS245 Introduction to Vibrations, Waves, and Thermal Physics (2 Semester) 2020, '22
- PHYS515 Methods in Mathematical Physics (1 Semester) 2020
- PHYS595 Graduate Seminar (3 Semesters) 2019-

Oxford Teaching

- **Stipendiary Lecturer in Physics**, New College, Oxford, UK. 2012-13
  1st year: Special Relativity, Complex numbers, ODEs, Linear Algebra
  2nd year: Statistical & Thermal Physics, Probability & Statistics.
- **Stipendiary Lecturer in Mathematics**, St. John's College & Pembroke College. 2008-12
  1st year: Geometry, Dynamics, Calculus in Three Dimensions, PDEs, Fourier Series
  2nd year: Differential Equations, Classical Mechanics, Multivariable Calculus.

Service

- **Convener:** SUSY2021, 'Split SUSY and High Scale SUSY' section. 2021
- **Member:** Educational policy sub-committee on particle & nuclear physics, UIC. 2020
- **Co-Chair:** Colloquium Committee, UIC. 2019-
- **Reviewer:** Italian Government 'Giovani Ricercatori' Postdoctoral Positions 2019
- **Referee:** Physical Review Letters, Physical Review D, Journal of High Energy Physics, Physics Letters B, Journal of Cosmology and Astroparticle Physics, European Physical Journal C, J. Global Optimization, J. Medical Internet Research, J. Infectious Disease Modelling.
- **Outreach Talks:** UIC's Young Scholars Program, Stanford High, New College, Oxford. 2021

Workshops organised

- **Co-organiser:** UIC annual "Sonia Kovalevsky Day" high school outreach. 2015-19
- "SIDE Math 2020", one-day workshop, UIC. June 2020
- "Current Trends in Particle Theory 2019", one-day workshop, UIC. June 2019
- "Current Trends in Particle Theory 2018", one-day workshop, UIC. March 2018
- "Current Trends in Particle Theory 2017", one-day workshop, UIC. March 2017

Colloquia

6. Amateur Astronomers Association of New York (AAANY). May 2022
5. University of Illinois at Chicago. February 2018
4. University of Utah. January 2018
3. Universidad de Buenos Aires, Argentina. May 2016
2. University of Liverpool, UK. December 2015
1. Purdue University, USA. January 2018

Workshop/ Conference talks

15. ICTP, Sao Paulo (New Trends in Dark Matter). December 2020
14. 2020 American Geophysical Union Meeting (invited talk) December 2020
13. Universidad de los Andes, Columbia (*MOCa 2019*). October 2019
12. KICP, University of Chicago, USA (*Towards Dark Matter Discovery*). April 2018
11. APS Prairie Section 2017 (Plenary Talk). August 2017
10. CP3-Origins, Denmark (parallel, *DAνCo Conference*). August 2017
9. Valongo Observatory, Chile (*Joint Rio Astrophysics Meeting*). February 2017
8. UN San Martin, Argentina (*NP@2017*). December 2016
7. Rencontres du Vietnam, Vietnam (parallel, *PASCOS 2016*). July 2016
6. GGI, Florence, Italy (*Gearing up for LHC13*). October 2015
5. Technical University Munich, Germany (*Anticipating discoveries*). July 2015
4. UMass Amherst, USA(parallel, *Baryon Lepton Violation 2015*). April 2015
3. National University of Singapore, IMS Summer School. July 2014
2. KITP, Santa Barbara, USA (*Particlegenesis*). June 2014
1. KICP, University of Chicago, USA (*Dark matter and the LHC*). September 2013

Seminars

55. Northwestern University, USA. March 2020
54. UC Berkeley, USA. December 2019
53. UC Davis, USA. December 2019
52. Stanford University, USA. November 2019
51. UC Santa Cruz, USA. November 2019
50. Brookhaven National Laboratory, USA. April 2019
49. University of Massachusetts at Amherst, USA. April 2019
48. University of Oxford, UK. November 2018
47. Durham University, UK. March 2018
46. University of Heidelberg, Germany. October 2017
45. Université Libre de Bruxelles, Belgium. October 2017
44. University of Bonn, Germany. October 2017
43. Korea Institute for Advanced Study, Seoul, South Korea. June 2017
42. Kavli IPMU, Japan. June 2017
41. University of Tokyo, Japan. June 2017
40. University of Southampton, UK. April 2017
39. Diderot-Paris VII (online), France. April 2017
38. Fermi National Accelerator Laboratory, USA. March 2017
37. Argonne National Laboratory, USA. March 2017
36. Tata Institute of Fundamental Research, Mumbai, India. March 2017
35. Raman Research Institute, Bangalore, India. March 2017
34. Indian Institute of Astrophysics, Bangalore, India. March 2017
33. Northwestern University, USA. February 2017
32. University of Chicago, USA. February 2017
31. Brazilian Center for Research in Physics, Brazil. February 2017
30. Perimeter Institute, Canada. February 2017
29. LPTHE, University Pierre and Marie Curie, Paris VI, France. July 2016
28. Universidad Nacional de La Plata, Argentina. May 2016
27. University of Texas, Austin, USA. April 2016
26. International Centre for Theoretical Sciences of the Tata Institute, India. March 2016
25. Indian Institute of Science, Bangalore, India. March 2016
24. CERN, Switzerland. January 2016
23. École Polytechnique Fédérale de Lausanne, Switzerland. January 2016
22. University of Liverpool, UK. December 2015
21. University of Nottingham, UK. December 2015
20. University of Notre Dame, USA. April 2015
19. Harvard University, USA. April 2015
18. University of Minnesota, USA. January 2015
17. UI Chicago, USA. January 2015
16. Caltech, USA. November 2014
15. UCLA, USA. November 2014
14. Korea Institute for Advanced Study, Seoul, South Korea. November 2014
13. KAIST, University in Daejeon, South Korea. November 2014
12. SLAC National Accelerator Laboratory, USA. October 2014
11. Fermi National Accelerator Laboratory, USA. April 2014
10. Argonne National Laboratory, USA. March 2014
9. University of Michigan, USA. February 2014
8. UI Urbana-Champaign, USA. November 2013
7. University of Notre Dame, USA. October 2013
6. University of Cambridge, UK. May 2013
5. Max Planck Institute for Kernphysik, Heidelberg, Germany. January 2013
4. University of Heidelberg, Germany. January 2013
3. Autonomous University of Barcelona, Spain. May 2012
2. University of Oxford, UK. April 2012
1. IPPP, University of Durham, UK. November 2011