

# Joseph DeRose

LBNL Chamberlain Fellow

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510-299-3495

## EMPLOYMENT DETAILS

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**Chamberlain Fellow** 2021-present  
*Lawrence Berkeley National Laboratory*

**Postdoctoral Scholar** 2019-2021  
*University of California, Santa Cruz & University of California, Berkeley*

## EDUCATION

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**PhD Physics** 2014-2019  
*Stanford University*  
Thesis advisor: Risa Wechsler

**BA Physics and Mathematics** 2009-2013  
*University of California, Berkeley*  
Magna Cum Laude with honors in physics and mathematics.  
Academic/Research advisors: Peter Nugent, Dan Kasen

## FELLOWSHIPS AND AWARDS

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1. Chamberlain prize fellowship (5yr position), Lawrence Berkeley National Laboratory
2. Paul Giddings Fellow, Kavli Institute for Particle Astrophysics and Cosmology

## RESEARCH INTERESTS

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- Large scale structure probes of dark energy, dark matter, inflation and light relics
- Analytic and simulation based models of galaxy clustering, weak lensing, and the CMB for stage III and stage IV surveys
- Machine learning, statistical inference, and high performance computing

## SCIENTIFIC COLLABORATIONS

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- DES: Builder, Small scales analysis team co-convener 2014-present
- DESI: Emulator sub-working group co-convener, EPO committee member 2015-present
- VRO LSST Dark Energy Science Collaboration: Member 2015-present

## PUBLICATIONS

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### Selected Publications (Major Contributions)

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1. White, M.; Zhou, R.; **DeRose, J.** et al., “Cosmological constraints from the tomographic cross-correlation of DESI Luminous Red Galaxies and Planck CMB lensing”, *astro-ph/2111.09898*.
2. Wechsler, R. H.; **DeRose, J.**; Busha, M. et al., “ADDGALS: Simulated Sky Catalogs for Wide Field Galaxy Surveys”, *astro-ph/2105.12105*.
3. **DeRose, J.**; Becker, M.; and Wechsler, R., “Modeling Redshift-Space Clustering with Abundance Matching”, *astro-ph/2105.12105*.
4. Pandey, S.; Krause, E.; **DeRose, J.** et al., “Dark Energy Survey Year 3 Results: Constraints on cosmological parameters and galaxy bias models from galaxy clustering and galaxy-galaxy lensing using the redMaGiC sample”, *astro-ph/2105.13545*.
5. **DeRose, J.**, Wechsler, R. H.; Becker, M. et al., “Dark Energy Survey Year 3 results: cosmology from combined galaxy clustering and lensing – validation on cosmological simulations”, *astro-ph/2105.13547*.
6. DES Collaboration et al., “Dark Energy Survey Year 3 Results: Cosmological Constraints from Galaxy Clustering and Weak Lensing”, *astro-ph/2105.13549*.
7. Kokron, N.; **DeRose, J.**; Chen, S.F. et al., “The cosmology dependence of galaxy clustering and lensing from a hybrid N-body–perturbation theory model”, *MNRAS* **505**, 1 (2021).
8. Varga, T.; **DeRose, J.**; Gruen, D. et al., “Dark Energy Survey Year 1 results: validation of weak lensing cluster member contamination estimates from P(z) decomposition”, *MNRAS* **489**, 2511V (2019).
9. **DeRose, J.** et al., “The Buzzard Flock: Dark Energy Survey Synthetic Sky Catalogs”, *astro-ph/19010.2401*.
10. **DeRose, J.**; Wechsler, R. H.; Tinker, J. L. et al., “The Aemulus Project I: Numerical Simulations for Precision Cosmology”, *ApJ* **875**, 69D (2019).
11. MacCrann, N.; **DeRose, J.**; Wechsler, R. H. et al., “DES Y1 Results: Validating cosmological parameter estimation using simulated Dark Energy Surveys”, *MNRAS* **480**, 4614-4635 (2018).
12. Friedrich, O.; Gruen, D.; **DeRose, J.** et al., “Density split statistics: joint model of counts and lensing in cells”, *PRD* **98**, 2 (2017).
13. DES Collaboration et al., “Dark Energy Survey Year 1 Results: Cosmological Constraints from Galaxy Clustering and Weak Lensing”, *PRD* **98**, 4 (2018).

### Other Publications

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84. Camacho, H. et al., “Cosmic Shear in Harmonic Space from the Dark Energy Survey Year 1 Data: Compatibility with Configuration Space Results”, *astro-ph/2111.07203*.
83. Gatti, M. et al., “Dark Energy Survey Year 3 results: cosmology with moments of weak lensing mass maps”, *astro-ph/2110.10141*.
82. Zurcher, D. et al., “Dark Energy Survey Year 3 results: Cosmology with peaks using an emulator approach”, *astro-ph/2110.10135*.
81. Cordero, J. et al., “Dark Energy Survey Year 3 results: Marginalisation over redshift distribution uncertainties using ranking of discrete realisations”, *astro-ph/2109.09636*.
80. Huang, S. et al., “The Outer Stellar Mass of Massive Galaxies: A Simple Tracer of Halo Mass with Scatter Comparable to Richness and Reduced Projection Effects”, *astro-ph/2109.02646*. 2021 <https://ui.adsabs.harvard.edu/abs/2021MNRAS...501...10H>.

79. Pandey, S. et al., “Cross-correlation of DES Y3 lensing and ACT/Planck thermal Sunyaev Zel’dovich Effect II: Modeling and constraints on halo pressure profiles”, *astro-ph/2108.01601*.
78. Gatti, M. et al., “Cross-correlation of DES Y3 lensing and ACT/Planck thermal Sunyaev Zel’dovich Effect I: Measurements, systematics tests, and feedback model constraints”, *astro-ph/2108.01600*.
77. Lokken, M. et al., “Superclustering with the Atacama Cosmology Telescope and Dark Energy Survey: I. Evidence for thermal energy anisotropy using oriented stacking”, *astro-ph/2107.05523*.2021
76. Zacharegkas, G. et al., “Dark Energy Survey Year 3 results: Galaxy-halo connection from galaxy-galaxy lensing”, *astro-ph/2106.08438*.2021
75. Krause, E. et al., “Dark Energy Survey Year 3 Results: Multi-Probe Modeling Strategy and Validation”, *astro-ph/2105.13548*.
74. Porredon, A. et al., “Dark Energy Survey Year 3 results: Cosmological constraints from galaxy clustering and galaxy-galaxy lensing using the MagLim lens sample”, *astro-ph/2105.13546*.2021
73. Secco, A. et al., “Dark Energy Survey Year 3 Results: Cosmology from Cosmic Shear and Robustness to Modeling Uncertainty”, *astro-ph/2105.13544S*.
72. Amon, A. et al., “Dark Energy Survey Year 3 Results: Cosmology from Cosmic Shear and Robustness to Data Calibration ”, *astro-ph/2105.13544S*.
71. Sanchez, C. et al., “Dark Energy Survey Year 3 Results: Exploiting small-scale information with lensing shear ratios ”, *astro-ph/2105.13542*.
70. Prat, J. et al., “Dark Energy Survey Year 3 Results: High-precision measurement and modeling of galaxy-galaxy lensing”, *astro-ph/2105.13541P*.
69. Rodriguez-Monroy, M. et al., “Dark Energy Survey Year 3 Results: Galaxy clustering and systematics treatment for lens galaxy samples ”, *astro-ph/2105.13540*.
68. Cawthon, R. et al., “Dark Energy Survey Year 3 Results: Calibration of Lens Sample Redshift Distributions using Clustering Redshifts with BOSS/eBOSS”, *astro-ph/2012.12826*.
67. Everett, S. et al., “Dark Energy Survey Year 3 Results: Measuring the Survey Transfer Function with Balrog”, *astro-ph/2012.12825*.
66. Gatti, M. et al., “Dark Energy Survey Year 3 Results: Clustering Redshifts – Calibration of the Weak Lensing Source Redshift Distributions with redMaGiC and BOSS/eBOSS”, *astro-ph/2012.08569*.
65. Adhikari, S. et al., “Probing galaxy evolution in massive clusters using ACT and DES: splashback as a cosmic clock ”, *astro-ph/2008.11663*.
64. McClintock, T. et al., “The Aemulus Project IV: Emulating Halo Bias”, *astro-ph/1907.13167*.
63. Mao, Y.Y. et al., “DESCQA: Synthetic Sky Catalog Validation Framework”, *ASCL*, (2018).
62. Davis, C. et al., “Dark Energy Survey Year 1 Results: Cross-Correlation Redshifts in the DES – Calibration of the Weak Lensing Source Redshift Distributions ”, *astro-ph/1710.02517*.
61. Krause, E. et al., “Dark Energy Survey Year 1 Results: Multi-Probe Methodology and Simulated Likelihood Analyses”, *astro-ph/1706.09359*.
60. Lee, S. et al., “Probing gravity with the DES-CMASS sample and BOSS spectroscopy”, *MNRAS in press*, (2021).
59. Massara, E. et al., “Line confusion in spectroscopic surveys and its possible effects: shifts in Baryon Acoustic Oscillations position ”, *MNRAS* **508**, 3 (2021).

58. Friedrich, O. et al., “Dark Energy Survey year 3 results: covariance modelling and its impact on parameter estimation and quality of fit”, *MNRAS* **508**, 3 (2021).
57. Shin, T. et al., “The mass and galaxy distribution around SZ-selected clusters”, *MNRAS* **507**, 4 (2021).
56. Bravo, M. et al., “Simultaneous Estimation of Large-scale Structure and Milky Way Dust Extinction from Galaxy Surveys”, *ApJ* **921**, 108 (2021).
55. Lee, S. et al., “Galaxy-galaxy lensing with the DES-CMASS catalogue: measurement and constraints on the galaxy-matter cross-correlation ”, *MNRAS* **in press**, (2021).
54. Lange, J. et al., “Five percent measurements of the growth rate from simulation-based modelling of redshift-space clustering in BOSS LOWZ”, *MNRAS* **509**, 2 (2021).
53. Hartley, W. et al., “Dark Energy Survey Year 3 Results: Deep Field optical + near-infrared images and catalogue”, *MNRAS* **in press**, (2021).
52. Lemos, P. et al., “Assessing tension metrics with dark energy survey and Planck data”, *MNRAS* **505**, 4 (2021).
51. Tinker, J. et al., “Probing the galaxy–halo connection with total satellite luminosity”, *MNRAS* **505**, 4 (2021).
50. Jeffrey, N. et al., “Dark Energy Survey Year 3 results: Curved-sky weak lensing mass map reconstruction”, *MNRAS* **505**, 3 (2021).
49. Myles, J. et al., “Dark Energy Survey Year 3 results: redshift calibration of the weak lensing source galaxies ”, *MNRAS* **505**, 3 (2021).
48. Abbott, T. et al., “The Dark Energy Survey Data Release 2 ”, *ApJ* **255**, 2 (2021).
47. Myles, J. et al., “Spectroscopic quantification of projection effects in the SDSS redMaPPer galaxy cluster catalogue”, *MNRAS* **505**, 1 (2021).
46. Doux, C. et al., “Dark energy survey internal consistency tests of the joint cosmological probes analysis with posterior predictive distributions”, *MNRAS* **503**, 2 (2021).
45. To, C. et al., “Dark Energy Survey Year 1 Results: Cosmological Constraints from Cluster Abundances, Weak Lensing, and Galaxy Correlations ”, *PRL* **126**, 141301 (2021).
44. Huang, H. et al., “Dark energy survey year 1 results: Constraining baryonic physics in the Universe”, *MNRAS* **502**, 4 (2021).
43. To, C. et al., “Combination of cluster number counts and two-point correlations: validation on mock Dark Energy Survey”, *PRL* **502**, 3 (2021).
42. Tanoglidis, H. et al., “Shadows in the Dark: Low-surface-brightness Galaxies Discovered in the Dark Energy Survey”, *ApJS* **252**, 18 (2021).
41. Pandey, S. et al., “Perturbation theory for modeling galaxy bias: Validation with simulations of the Dark Energy Survey”, *ApJS* **102**, 123522 (2020).
40. Schmidt, S. et al., “Evaluation of probabilistic photometric redshift estimation approaches for The Rubin Observatory Legacy Survey of Space and Time (LSST)”, *ApJS* **499**, 2 (2020).
39. Pereira, M. E. S. et al., “ $\mu_*$  Masses: Weak Lensing Calibration of the Dark Energy Survey Year 1 redMaPPer Clusters using Stellar Masses”, *MNRAS* **498**, 4 (2020).
38. Gatti, M. et al., “Dark Energy Survey Year 3 results: cosmology with moments of weak lensing mass maps – validation on simulations”, *MNRAS* **498**, 3 (2020).

37. Hartley, W. et al., “The impact of spectroscopic incompleteness in direct calibration of redshift distributions for weak lensing surveys”, *MNRAS* **496**, 4 (2020).
36. DES Collaboration et al., “Dark Energy Survey Year 1 Results: Cosmological Constraints from Cluster Abundances and Weak Lensing”, *PRD* **102**, 023509 (2020).
35. Palmese, A et al., “Stellar mass as a galaxy cluster mass proxy: application to the Dark Energy Survey redMaPPer clusters”, *MNRAS* **493**, 4591P (2020).
34. Carter, P. et al., “The impact of the fiducial cosmology assumption on BAO distance scale measurements”, *MNRAS* **494**, 2076C (2020).
33. Fang, Y. et al., “Dark Energy Survey year 1 results: the relationship between mass and light around cosmic voids”, *MNRAS* **490**, 3573F (2019).
32. Korytov, D. et al., “CosmoDC2: A Synthetic Sky Catalog for Dark Energy Science with LSST”, *ApJS* **245**, 26K (2019).
31. Pandey, S. et al., “Constraints on the redshift evolution of astrophysical feedback with Sunyaev-Zel’dovich effect cross-correlations”, *PhRvD* **100f**, 3519P (2019).
30. Martens, D. et al., “Effects of NII and H $\alpha$  Line Blending on the WFIRST Galaxy Redshift Survey”, *MNRAS* **485**, 211M (2019).
29. Leistedt, B. et al., “Hierarchical modeling and statistical calibration for photometric redshifts”, *ApJ* **881**, 80L (2019).
28. DES Collaboration et al., “Dark Energy Survey Year 1 Results: Joint Analysis of Galaxy Clustering, Galaxy Lensing, and CMB Lensing Two-point Functions”, *PhRvD* **100b**, 3541A (2019).
27. Omori, Y. et al., “Dark Energy Survey Year 1 Results: Cross-correlation between DES Y1 galaxy weak lensing and SPT+Planck CMB weak lensing”, *PhRvD* **100d**, 3517O (2019).
26. DES Collaboration et al., “Dark Energy Survey Year 1 Results: Constraints on Extended Cosmological Models from Galaxy Clustering and Weak Lensing”, *PhRvD* **99l**, 3505A (2019).
25. Costanzi, M. et al., “Methods for cluster cosmology and application to the SDSS in preparation for DES Year 1 release”, *MNRAS* **487**, 48C (2019).
24. Chuang, C.H. et al., “UNIT project: Universe  $N$ -body simulations for the Investigation of Theoretical models from galaxy surveys”, *MNRAS* **487**, 48C (2019).
23. DES Collaboration et al., “Cosmological Constraints from Multiple Probes in the Dark Energy Survey”, *PhRvL* **122q**, 1301A (2019).
22. Shin, T. et al., “Measurement of the Splashback Feature around SZ-selected Galaxy Clusters with DES, SPT and ACT”, *ApJ* **872**, 53M (2019).
21. Buchs, R.; Davis, C. et al., “Phenotypic redshifts with self-organizing maps: A novel method to characterize redshift distributions of source galaxies for weak lensing”, *MNRAS* **489**, 820B (2019).
20. McClintock, T. et al., “The Aemulus Project II: Emulating the Halo Mass Function”, *ApJ* **872**, 95Z (2019).
19. Zhai, Z. et al., “The Aemulus Project III: Emulation of the Galaxy Correlation Function”, *ApJ* **874**, 53M (2019).
18. Abbott, T. M. C. et al., “The Dark Energy Survey Data Release 1”, *ApJS* **239**, 18A (2018).
17. Gruen, D. et al., “Density split statistics: Cosmological constraints from counts and lensing in cells in DES Y1 and SDSS”, *PRD* **98**, 2 (2018).

16. Cawthon, R. et al., “Dark Energy Survey Year 1 Results: calibration of redMaGiC redshift distributions in DES and SDSS from cross-correlations”, *MNRAS* **481**, 2427-2443 (2018).
15. Abbott, T. M. C. et al., “Dark Energy Survey Year 1 Results: A Precise H0 Estimate from DES Y1, BAO, and D/H Data”, *MNRAS* **481**, 2427-2443 (2018).
14. McClintock, T. et al., “Dark Energy Survey Year 1 Results: Weak Lensing Mass Calibration of redMaPPer Galaxy Clusters”, *MNRAS* **482**, 1352-1378 (2018).
13. Costanzi, M. et al., “Modeling projection effects in optically-selected cluster catalogues”, *MNRAS* **482**, 490-505 (2018).
12. Troxel, M. A. et al., “Survey geometry and the internal consistency of recent cosmic shear measurements”, *MNRAS* **479**, 4998-5004 (2018).
11. Troxel, M. A. et al., “Dark Energy Survey Year 1 Results: Cosmological Constraints from Cosmic Shear”, *PRD* **98**, 4 (2018).
10. Hoyle, B. et al., “Dark Energy Survey Year 1 Results: redshift distributions of the weak-lensing source galaxies”, *MNRAS* **478**, 592-610 (2018).
9. Malz, A. et al., “Approximating photo-z PDFs for large surveys”, *AJ* **156**, 35 (2018).
8. Gatti, M. et al., “Dark Energy Survey Year 1 results: cross-correlation redshifts - methods and systematics characterization”, *MNRAS* **477**, 1664-1682 (2018).
7. Chang, C. et al., “Dark Energy Survey Year 1 results: curved-sky weak lensing mass map”, *MNRAS* **475**, 3165-3190 (2018).
6. Mao, Y.Y. et al., “DESCQA: An Automated Validation Framework for Synthetic Sky Catalogs”, *ApJ Supp.* **234**, 36 (2018).
5. Frohmaier, C. et al., “Real-time Recovery Efficiencies and Performance of the Palomar Transient Factory’s Transient Discovery Pipeline”, *ApJ Supplement* **230**, 4 (2017).
4. Kovács, A. et al., “Imprint of DES superstructures on the cosmic microwave background”, *MNRAS* **465**, 4166 (2018).
3. Sánchez, C. et al., “Cosmic voids and void lensing in the Dark Energy Survey Science Verification data”, *MNRAS* **465**, 746 (2017).
2. Kwan, J. et al., “Cosmology from large-scale galaxy clustering and galaxy-galaxy lensing with Dark Energy Survey Science Verification data”, *MNRAS* **464**, 4045 (2017).
1. Pan, Y.-C. et al., “The host galaxies of Type Ia supernovae discovered by the Palomar Transient Factory”, *MNRAS* **438**, 1391 (2014).

## GRANTS AND COMPUTING ALLOCATIONS

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- NASA ATP, “Leveraging Weak Gravitational Lensing - Redshift Space Distortions Cross-correlations”, (Collaborator, 2022-2024).
- XSEDE, “N-body Simulations for Cosmic Acceleration and Neutrino Science with Wide Field Galaxy Surveys”, 43000 node hours (Co-I, 1/20 - 1/21).
- XSEDE, “Cosmological Simulations of Dark Energy and Massive Neutrinos for Wide Field Galaxy Surveys”, 4000 node hours (PI, 6/20 - 6/21).
- NERSC, “Cosmological Simulations for Sky Surveys”, 5M NERSC hours (co-I, 1/21 - 12/21).

- NERSC, “Cosmological Simulations for Sky Surveys”, 7M NERSC hours (co-I, 1/20 - 12/20).
- NERSC, “Cosmological Simulations for Sky Surveys”, 7M NERSC hours (co-I, 1/19 - 12/19).
- NERSC, “Cosmological Simulations for Sky Surveys”, 9M NERSC hours (co-I, 1/18 - 12/18).

## TALKS

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Technical talks only, not including talks internal to collaborations of which I am a member.

16. Astronomy Colloquium, University of British Columbia, 10/21 (**Invited**)
15. Astrophysics Colloquium, Stanford University, 6/21 (**Invited**)
14. Dark Energy Survey Year 3 Results Webinar, Virtual, 5/21
13. Institute for Nuclear and Particle Astrophysics Seminar, LBNL, 1/21 (**Invited**)
12. German Center for Cosmological Lensing Seminar, Remote talk, 5/20 (**Invited**)
11. Spectroscopic Surveys: Are We Ready For the Future?, UC Berkeley, 1/20 (**Invited**)
10. AAS Thesis Spotlight, Seattle, 1/19
9. FLASH Seminar, UC Santa Cruz, 9/18 (**Invited**)
8. Astro Seminar, NYU, 9/18 (**Invited**)
7. Berkeley Cosmology Seminar, UC Berkeley, 9/18 (**Invited**)
6. Modeling the Extragalactic Sky, UC Berkeley, 1/18 (**Invited**)
5. Astrophysics Colloquium, Stanford University, 9/17 (**Invited**)
4. Webinar, Laboratório Interinstitucional de e-Astronomia, Brazil, 7/17 (**Invited**)
3. COSMO16, University of Michigan, 8/16
2. KIPAC Tea, Stanford University, 9/16
1. Mock Santiago: Preparing for the Next Generation of Surveys, Universidad Catolica, Santiago, Chile, 4/16 (**Invited**)

## STUDENTS SUPERVISED

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1. Vincent Su, B.S. Stanford '17
2. Amara McCune, B.S. Stanford '18
3. Duncan Wood, B.S. Stanford '17
4. Judah Luberto, B.S. UCSC '22
5. Nishant Mishra, B.S. UC Berkeley '21

## SERVICE AND OUTREACH

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- LBNL INPA Seminar committee member
- DESI Education and Public Outreach committee member, 2021-present
- Astro Scholar Mentor, Berkeley Astro Department, 2020-2021
- Organizer for Astronomy on Tap (2016-2020)
- Lead Organizer for “Meetings of Astrophysics Students at Stanford” seminar series (2016-2018)
- Lead Organizer for [Stanford Physics Computing Bootcamp](#) (2016-2018)
- Referee: Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Journal of Cosmology and Astroparticle Physics, Astronomy & Astrophysics, NASA Future Investigators in Earth and Space Science and Technology (FINESST)

## TEACHING

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- Spring 2015: **PHYS25 Modern Physics**  
T.A.
- Winter 2017: **PHYS16 The Origin and Development of the Cosmos**  
T.A.
- Winter 2018: **PHYS16 The Origin and Development of the Cosmos**  
T.A.

## REFERENCES

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### **Risa Wechsler**

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### **Martin White**

Professor of Physics & Astronomy, UC Berkeley  
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### **Alexie Leauthaud**

Assistant Professor of Astronomy, UC Santa Cruz  
[alexie@ucsc.edu](mailto:alexie@ucsc.edu)

### **Bhuvnesh Jain**

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[bjain@physics.upenn.edu](mailto:bjain@physics.upenn.edu)