

## Vinu Vikram

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AFFILIATION	Postdoctoral fellow, High Energy Physics Argonne National Laboratory 9700 South Cass Avenue Lemont, Illinois, USA 60439	<i>Phone:</i> (+1) 267 210 2853 vvinuv@gmail.com <a href="http://www.sas.upenn.edu/~vinu/">http://www.sas.upenn.edu/~vinu/</a>
CITIZENSHIP	India	
EDUCATION	Postdoctoral Fellow, 2014 August - High Energy Physics, Argonne National Laboratory, Lemont, Illinois, USA  Postdoctoral Fellow, 2010 September - 2014 August Department of Physics & Astronomy, University of Pennsylvania, Philadelphia, PA, USA  Ph. D. 2010 (submitted) 2011 (awarded) School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam, Kerala, India & The Inter-University Centre for Astronomy and Astrophysics, Pune, India <ul style="list-style-type: none"><li>• Topic : Evolution of Galaxies at Moderate Redshift</li><li>• Supervisors : Prof. Ajit K. Kembhavi IUCAA, Pune, India, Dr. K. Indulekha, School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam, Kerala, India.</li></ul> M. Sc. Physics School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam, Kerala, India, 2003, First Class  B. Sc. Physics M. S. M. College, Kayamkulam, Kerala, India, 2001, First Class	
RESEARCH INTERESTS	Weak lensing, Observational tests of gravity, Dark Energy Survey, Galaxy Morphology, Formation and Evolution of Galaxies, Galaxies at High Redshift, Software Development for Astronomical Data Processing.	
AWARDS	Recipient of UGC-CSIR Fellowship for 2006 - 2010 Summer Research Student Fellowship, Physical Research Laboratory, Ahamadabad, India, 2003	
TECHNICAL SKILLS	Expertise in Image Reduction and Analysis Facility (IRAF) to reduce and analyze optical astronomy data. Expertise in analysing large data including simulations. Expertise in writing softwares using Python. Moderate experience with C, Linux Shell Scripting. Other Scripting Languages/Packages : PyRAF, SQL, SVN, HTML, Python-numpy, Python-scipy, Python-matplotlib  Operating Systems : Linux, Windows Applications : Healpix, Virtual Observatory Tools, R, Mathematica Astronomical Data : Experience in working with HST-ACS/HST-WFPC2, Planck, SPT data  Other : MESA (Simulation software for stellar evolution)	

SOFTWARE  
DEVELOPED

**PyMorph**, which is a pipeline written in Python to estimate both parametric and non-parametric morphological parameters of galaxies. PyMorph has both serial and parallel versions. Serial version of PyMorph can be downloaded from <https://github.com/vvinuv/pymorph>  
**KappaBias**, which is a tool for estimating galaxy bias from observed galaxy distributions and weak lensing measurements. This is based on the method by Amara et al. (2011). This can be downloaded from <https://github.com/vvinuv/kappabias>  
Worked collaboratively on software related to photometric calibration, mass mapping, photo-z testing for DES

ACADEMIC &  
TEACHING  
EXPERIENCE

Postdoctoral fellow, Argonne National Laboratory, Lemont, Illinois, USA (2014 August - )  
Postdoctoral fellow, University of Pennsylvania, Philadelphia, PA, USA (2010 September - 2014 August)  
Co-advisor to Dr. Alan Meert, a graduate student at the University of Pennsylvania (2010-2015)  
Co-advisor to two undergrad students for a project on gravity tests at the University of Pennsylvania (2013)  
Graduate School, The Inter-University Centre for Astronomy and Astrophysics, Pune, India, (2005)  
Tutor for the participants of the *Mini-school on Astronomy and Astronomical Data Analysis* organized by IUCAA, Pune at Newman College, Thodupuzha, Kerala, India (2007)  
Project Co-Supervisor, M. Sc. Students, Mahatma Gandhi University, Kottayam, India (2008)  
Lectures on *Galaxy Morphology* and *Virtual Observatory Tools* for the IUCAA VSP & Summer School Students (2008)  
Project Co-Supervisor, M. Sc. Students, Newman College, Thodupuzha, India (2009)

PUBLICATIONS

1. Gruen, ..., **Vinu Vikram** ... et al, Weak lensing by galaxy troughs in DES Science Verification data, MNRAS, 2016, 455, 3367
2. Meet, **Vinu Vikram**, Bernardi, A catalogue of two-dimensional photometric decompositions in the SDSS-DR7 spectroscopic main galaxy sample: extension to g and i bands, MNRAS, 2016, 455, 2440
3. Saro et al., Constraints on the Richness-Mass Relation and the Optical-SZE Positional Offset Distribution for SZE-Selected Clusters, MNRAS, 2015, 454, 2305
4. Melchior., **Vinu Vikram** ... et al et al., Crowdsourcing quality control for Dark Energy Survey images, 2015arXiv151103391M
5. Drlica-Wagner, ..., **Vinu Vikram** ... et al, Eight Ultra-faint Galaxy Candidates Discovered in Year Two of the Dark Energy Survey, 2015, ApJ, 813, 109
6. Chang, **Vinu Vikram** et al, Wide-Field Lensing Mass Maps from DES Science Verification Data, Physical Review Letter, 2015, 115, 1301
7. **Vinu Vikram** et al, Wide-Field Lensing Mass Maps from DES Science Verification Data: Methodology and Detailed Analysis, Physical Review D, 2015, 92, 2006
8. Suchyta, ... **Vinu Vikram** ... et al, No galaxy left behind: accurate measurements with the faintest objects in the Dark Energy Survey, 2015arXiv150708336S

9. Bonnett, ... **Vinu Vikram** ... et al, Redshift distributions of galaxies in the DES Science Verification shear catalogue and implications for weak lensing, 2015arXiv150705909B
10. Leistedt, ... **Vinu Vikram** ... et al, Mapping and simulating systematics due to spatially-varying observing conditions in DES Science Verification data, 2015arXiv150705647L
11. Jarvis, ... **Vinu Vikram** ... et al, The DES Science Verification Weak Lensing Shear Catalogs, 2015arXiv150705603J
12. Becker, ... **Vinu Vikram** ... et al, Cosmic Shear Measurements with DES Science Verification Data, 2015arXiv150705598B
13. The Dark Energy Survey Collaboration, Cosmology from Cosmic Shear with DES Science Verification Data, 2015arXiv150705552T
14. Giannantonio, ... **Vinu Vikram** ... et al, CMB lensing tomography with the DES Science Verification galaxies, 2015arXiv150705551G
15. Rozo, ... **Vinu Vikram** ... et al, redMaGiC: Selecting Luminous Red Galaxies from the DES Science Verification Data, 2015arXiv150705460R
16. Crocce, ... **Vinu Vikram** ... et al, Galaxy clustering, photometric redshifts and diagnosis of systematics in the DES Science Verification data, 2015arXiv150705360C
17. Park, ... **Vinu Vikram** ... et al, Joint Analysis of Galaxy-Galaxy Lensing and Galaxy Clustering: Methodology and Forecasts for DES, 2015arXiv150705353P
18. Simon, ... **Vinu Vikram** ... et al, Stellar Kinematics and Metallicities in the Ultra-Faint Dwarf Galaxy Reticulum II, 2015, ApJ, 808, 95
19. Melchior, ... **Vinu Vikram** ... et al., Mass and galaxy distributions of four massive galaxy clusters from Dark Energy Survey Science Verification data, 2015, MNRAS, 449, 2219
20. Gruen, Bernstein, Jarvis, Rowe, **Vinu Vikram**, Plazas, Seitz, S., Characterization and correction of charge-induced pixel shifts in DECam, 2015, JInst, 10, 5032
21. Zhang et al., Galaxies in X-ray Selected Clusters and Groups in Dark Energy Survey Data: Stellar Mass Growth of Bright Central Galaxies Since  $z \approx 1.2$ , 2015, arXiv:150402983
22. Simon et al, Stellar Kinematics and Metallicities in the Ultra-Faint Dwarf Galaxy Reticulum II, 2015, arXiv:150402889
- <sup>1</sup> 23. Alan Meert, **Vinu Vikram**, Mariangela Bernardi, A catalogue of 2D photometric decompositions in the SDSS-DR7 spectroscopic main galaxy sample: preferred models and systematics, 2015, MNRAS, 446, 3943
24. Shankar et al., On the Intermediate-redshift Central Stellar Mass-Halo Mass Relation, and Implications for the Evolution of the Most Massive Galaxies Since  $z \approx 1$ , 2014, ApJ, 797, 27
25. M. Bernardi, A. Meert, **Vinu Vikram**, M. Huertas-Company, S. Mei, F. Shankar,

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<sup>1</sup>co-supervised the first author

- R. K. Sheth, Systematic effects on the size-luminosity relation: dependence on model fitting and morphology, 2014, MNRAS, 443, 874
26. Jeremy Sakstein, Bhuvnesh Jain, **Vinu Vikram**, Testing Gravity Theories Using Stars, 2014, arXiv:1409.3708S
27. Jeremy Sakstein, Bhuvnesh Jain, **Vinu Vikram**, Detecting modified gravity in the stars, 2014, IJMPD, 2342002
28. **Vinu Vikram** et al., Astrophysical Tests of Modified Gravity: Stellar and Gaseous Rotation Curves in Dwarf Galaxies, 2014, arXiv1407.6044
29. Joydeep Bagchi, Vivek M., **Vinu Vikram** et al., Megaparsec Relativistic Jets Launched from an Accreting Supermassive Black Hole in an Extreme Spiral Galaxy, 2014, ApJ, 788, 174
30. Bhuvnesh Jain, **Vinu Vikram**, Jeremy Sakstein, Astrophysical Tests of Modified Gravity: Constraints from Distance Indicators in the Nearby Universe, 2013, ApJ, 779, 39
31. Marc Huertas-Company, Francesco Shankar, Simona Mei, Mariangela Bernardi, J.A.L. Aguerri, Alan Meert, **Vinu Vikram**, The dependence of the mass-size relation of early-type galaxies on environment in the local Universe, 2013, ApJ, 779, 29
32. M. Bernardi, A. Meert, R. K. Sheth, **V. Vikram**, M. Huertas-Company, S. Mei, F. Shankar, The massive end of the luminosity and stellar mass functions: Dependence on the fit to the light profile, 2013, MNRAS, 436, 697
33. **Vinu Vikram**, Anna Cabre, Bhuvnesh Jain, Jake VanderPlas, Astrophysical Tests of Modified Gravity: the Morphology and Kinematics of Dwarf Galaxies, 2013, JCAP, 8, 20, arXiv:1303.0295
- <sup>2</sup> 34. Alan Meert, **Vinu Vikram**, Mariangela Bernardi, Simulations of single- and two-component galaxy decompositions for spectroscopically selected galaxies from the Sloan Digital Sky Survey, 2013, MNRAS, 443, 1344, arXiv:1211.6123
35. D. Gruen, F. Brimiouille, S. Seitz, C.-H. Lee, J. Young, J. Koppenhoefer, T. Eichner, A. Riffeser, **V. Vikram**, T. Weidinger, A. Zenteno, Weak lensing analysis of RXC J2248.7-4431, 2013, MNRAS, 432, 1455
36. Francesco Shankar, Federico Marulli, Mariangela Bernardi, Simona Mei, Alan Meert, **Vinu Vikram**, Size Evolution of Spheroids in a Hierarchical Universe, 2013, MNRAS, 428, 109
37. Anna Cabre, **Vinu Vikram**, Gong-Bo Zhao, Bhuvnesh Jain, Kazuya Koyama, Astrophysical Tests of Modified Gravity: A Screening Map of the Nearby Universe, 2012, JCAP, 7, 34, arXiv:1204.6046
38. **Vinu Vikram**, Yogesh Wadadekar, Ajit Kembhavi and G. V. Vijayagovindan, PyMorph: Automated Galaxy Structural Parameter Estimation using Python, 2010, MNRAS, 409, 1379

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<sup>2</sup>co-supervised the first author

39. **Vinu Vikram**, Yogesh Wadadekar, Ajit Kembhavi and G. V. Vijayagovindan, Quantitative measure of evolution of bright cluster galaxies at moderate redshifts, 2010, MNRAS Letters, 401, 39

OTHER  
PUBLICATIONS

1. Abbott et al., First SN Discoveries from the Dark Energy Survey, 2012, ATel, 4668, 1
2. Jain et al. Novel Probes of Gravity and Dark Energy, 2013, Report from the "Dark Energy and CMB" working group for the American Physical Society's Division of Particles and Fields long-term planning exercise ("Snowmass")
3. Vinu Vikram et al., Evolution of Cluster Galaxies at  $0.28 < z < 0.8$ , 2009, 27th Meeting of the Astronomical Society of India

TALKS

*Dark Energy Survey: Weak Lensing mass map from SV*: December 2014, DES Chicagoland meeting, Argonne National Laboratory, Illinois  
*Dark Energy Survey: Weak Lensing mass map from SV*: December 2014, KICP, University of Chicago (Invited)  
*Astrophysical tests of gravity: Constraints from nearby Universe*: January 2014, Princeton University (Invited)  
*Astrophysical tests of gravity: Constraints from nearby Universe*: January 2014, Argonne National Laboratory, Chicago (Invited)  
*Astrophysical tests of gravity*: November 2013, University of California & LBL, Berkeley (Invited)  
*Astrophysical tests of modified gravity: Constraints from nearby Universe*: October 2013, Carnegie Mellon University, Pittsburgh (invited)  
*Tests of Modified Gravity: Constraints from Distance Indicators in the Nearby Universe*: April 2013, Novel Probes of Gravity and Dark Energy Workshop, University of Pennsylvania  
*Wide field mass map*: April 2013, DES Spring Collaboration Meeting, Lawrence Berkeley National Laboratory, Berkeley  
*Flux dependent PSF on DES images*: April 2013, DES Spring Collaboration Meeting, Lawrence Berkeley National Laboratory, Berkeley  
*Illumination (star) flat for DES survey*: December 2012, DES Collaboration Meeting, Texas A& M University  
*KL based mass mapping in the presence of mask*: December 2012, DES Collaboration Meeting, Texas A& M University  
*Astrophysical Tests of Modified Gravity: Constraints from Distance Indicators in the Nearby Universe*: April 2012, East Coast gravity meeting, Syracuse University, USA  
*Tests of Gravity using Cepheids and Other Distance Indicators*: March 2012, Journal Club, University of Pennsylvanias, USA  
*Astrophysical Tests of Modified Gravity*: July 2012, Santa Fe cosmology workshop (Invited)  
*PyMorph: Automated Galaxy Structural Parameter Estimation in Python*: October 2009, International Conference on High Performance Computing in Observational Astronomy: Requirements and Challenges, IUCAA, Pune, India (invited)  
*Demo on PyMorph: Software for Automated Galaxy Structural Parameter Estimation*: August 2009, Satellite meeting on Large data sets & follow up observations, First IUCAA Reunion Meeting, IUCAA, Pune, India  
*Evolution of cluster galaxies at  $0.28 < z < 0.8$* , June 2008, Scientific Advisory Committee Meeting of IUCAA, Pune, India (Invited)  
*Morphological Parameters of Galaxies: An Automated Tool*, January 2008, 11<sup>th</sup> Young Astronomer's Meet, Mahatma Gandhi University, Kottayam, Kerala, India

SCIENTIFIC  
ORGANIZATION

**Co-organizer** of the Dark Energy Survey Chicagoland meeting at Argonne National Laboratory, Illinois, USA (December, 2014)

**Co-organizer** of the Novel Probes of Gravity and Dark Energy Workshop at University of Pennsylvania, USA (April, 2013)

**LOC** member of the dark energy survey collaboration meeting at University of Pennsylvania, USA (2011)

**LOC** member of the Workshop on Advances in Observational Astronomy at School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam, India, (2009)

**SOC** member of the 12<sup>th</sup> *Young Astronomers' Meet* at IIT, Kharagpur, India, (2009)

**Convenor** and **SOC** member of the 11<sup>th</sup> *Young Astronomers' Meet* at School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam, India, (2008)

UNIVERSITY  
SERVICES

Senate Member of the Mahatma Gandhi University, Kottayam, India (2009)

Chairman of the Departments Students Union, Mahatma Gandhi University, Kottayam, India (2009)