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Mark C. Neyrinck
Curriculum Vitæ
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Born Oct 1, 1977 in Colorado; Citizen of USA

CV last updated Mar 2009

Education

- Ph.D. in Astrophysics**, University of Colorado at Boulder *August 2005*
Thesis: "Illuminating the Tips of Dark Matter Icebergs"
Advisors: Andrew J. S. Hamilton, Nickolay Y. Gnedin
- M.S. in Astrophysics (High Pass)**, University of Colorado at Boulder *December 2002*
Thesis: "Understanding the PSCz Galaxy Power Spectrum
with N-body Simulations"
Advisors: Andrew J. S. Hamilton, Nickolay Y. Gnedin
- B.A. in Physics (Honors) w/spec. in Astronomy**, University of Chicago *June 2000*
Thesis: "Modeling Steady-State Disk Accretion in the
Magnetosphere of a Young Star"
Advisor: Arie H. Königl
- Mathematics, Part IB (2:1)**, Pembroke College, Cambridge Univ., UK *attended 1998-1999*
- International Baccalaureate Diploma** *May 1995*
Extended Essay: "Fractionally and Infinitely Iterated Exponentiation"

Awards and Grants

- Richard N. Thomas Award** (for outstanding research by a JILA graduate student in Astrophysics) *2005*
- Small Allocations**, annual, National Computational Science Alliance *2001-2004*
- Honorable Mention**, NASA Graduate Student Researchers Program *2002*
- Honorable Mention**, NSF Graduate Research Fellowship *2001*
- Fellowships**, annual, CU Astrophysical and Planetary Sciences Department *2000-2004*
- Lewis Prize** (for the outstanding undergraduate thesis and academic record of a graduating physics concentrator at the University of Chicago) *2000*
- Donnelley Fellowship** (for one year at Cambridge University, awarded to one undergraduate per year at the University of Chicago) *1998*
- Phi Beta Kappa**, University of Chicago *2000*
- Dean's List**, University of Chicago *1995-2000*
- National Merit Scholarship; High-School Valedictorian** *1995*

Employment

- Keck Fellow**, Dept. of Physics & Astronomy, Johns Hopkins U. *Fall 2008-present*
- Postdoctoral Fellow**, Institute for Astronomy, U. of Hawaii *Fall 2005-Fall 2008*
- Course Instructor** ("Black Holes"), APS Dept., U. of Colorado *Summer 2005*
- Research Assistantship**, JILA, U. of Colorado *Summer 2000-Fall 2004*
- Teaching Assistantship**, APS Dept., U. of Colorado *Fall 2000, Fall 2002, Spring 2005*
- Teaching Assistantship**, Math Dept., U. of Chicago *1997-1998, 1999-2000*
- Research Assistantship**, High Altitude Observatory, Boulder *Summer 1998*
- Research Assistantship**, Solar Tower Atmospheric Cherenkov Effect Experiment, Univ. of Chicago *Spring 1997-Spring 1998*

Outreach Activities and Departmental Service

Institute for Astronomy Open Houses	2006, 2007
Supervising the “Astronomy” and “Reach for the Stars” events for Colorado Science Olympiad (middle and high school) competitions	2001, 2003, 2004, 2005
Running open houses at Boulder’s Sommers-Bausch Observatory	2000-2004
Judging science fairs	2002, 2003
Colloquium committee, IfA, U of Hawaii	2007-present
Colloquium committee, Holiday skit writing and organization, APS Dept., U of Colorado	2001-2004

Non-Astronomical Interests

Music composition, piano, creative writing, mathematics

Computer Skills

Highly proficient in Python, C, IDL, HTML, LaTeX, Linux, and Mathematica
Have also programmed in Java, C++, Perl, Lisp, Pascal, and Inform
Extensive experience with N -body simulations, FFT’s, parallelization and running highly parallel applications
Main developer of CosmoPy (<http://www.ifa.hawaii.edu/cosmopy/>), a package of Python code for cosmology
Developed the publicly available cosmological halo-finder VOBOZ and the void-finder ZOBOV (<http://www.ifa.hawaii.edu/~neyrinck/voboz>)

Summary of Research Interests and Previous Work

My primary fields of interest include **cosmology**, **the large-scale structure of the Universe**, and **galaxy formation**. Using computational and analytic methods, I have studied the **relationship between galaxies and dark matter** on large scales, the substructure of dark-matter haloes, and the amount of **cosmological information** that can be extracted on different scales from clustering statistics. I am a main developer of the publicly available CosmoPy package of Python code for cosmological research, in particular, its **cosmological perturbation theory** and **halo-model** code. I have extensive experience running and analyzing **N -body simulations**; I developed the publicly available halo-finder VOBOZ for them, as well as its inverse, the void-finder ZOBOV. I have also developed a ‘galaxy-halo’ model of large-scale structure, which explains some features of galaxy-matter bias and cross-correlation within a simple framework.

Refereed Publications

Granett, B. R., Neyrinck, M. C., Szapudi, I., A Map of the Integrated Sachs-Wolfe Signal from Luminous Red Galaxies, 2008, *ApJ*, submitted, arXiv:0812.1025

Granett, B. R., Neyrinck, M. C., Szapudi, I., An Imprint of Superstructures on the Microwave Background due to the Integrated Sachs-Wolfe Effect, 2008, *ApJ Letters*, 683, L99, arXiv:0805.3695

Colberg, J. M., ..., Neyrinck, M. C. et al., The Aspen-Amsterdam void finder comparison project, 2008, *MNRAS*, 387, 933, arXiv:0803.0918

Neyrinck, M. C., ZOBOV: a parameter-free void-finding algorithm, 2008, *MNRAS*, 386, 2101, arXiv:0712.3049

Neyrinck, M. C., Szapudi, I., Baryon oscillations in galaxy and matter power-spectrum covariance matrices, 2008, *MNRAS*, 384, 1221, arXiv:0710.3586

Neyrinck, M. C., Szapudi, I., Information content in the halo-model dark-matter power spectrum - II. Multiple cosmological parameters, 2007, *MNRAS*, 375, L51, arXiv:astro-ph/0610211

Neyrinck, M. C., Szapudi, I., Rimes, C. D., Information content in the halo-model dark-matter power spectrum, 2006, *MNRAS*, 370, L66, arXiv:astro-ph/0604282

Neyrinck, M. C., Hamilton, A. J. S., Gnedin, N. Y., A galaxy halo model of large-scale structure, 2005, *MNRAS*, 362, 337, arXiv:astro-ph/0504161

Neyrinck, M. C., Gnedin, N. Y., Hamilton, A. J. S., VOBOZ: an almost-parameter-free halo-finding algorithm, 2005, *MNRAS*, 356, 1222, arXiv:astro-ph/0402346

Neyrinck, M. C., Hamilton, A. J. S., Gnedin, N. Y., Understanding the PSCz galaxy power spectrum with N-body simulations, 2004, *MNRAS*, 348, 1, arXiv:astro-ph/0302003

Gnedin, N. Y., ..., Neyrinck, M. C., et al., 2003, *ApJ*, 583, 525, arXiv:astro-ph/0206421

References

1. **Dr. Andrew J. S. Hamilton**, JILA and Dept of Astrophysical and Planetary Sciences, University of Colorado; Campus Box 440, Boulder, CO 80309
Andrew.Hamilton@colorado.edu, (303) 492-7833
2. **Dr. Nickolay Y. Gnedin**, Theoretical Astrophysics Group, Fermilab, and Dept of Astronomy and Astrophysics, University of Chicago; Fermilab MS209, PO Box 500, Batavia, IL 60510
gnedin@fnal.gov, (630) 840-2313
3. **Dr. István Szapudi**, Institute for Astronomy, University of Hawaii
2680 Woodlawn Drive, Honolulu, HI 96822
szapudi@ifa.hawaii.edu, (808) 956-6196