

Zarija Lukić

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Personal

Citizenship: Serbian

Education

Ph.D. Astronomy, University of Illinois at Urbana–Champaign, 2008
Nonlinear Growth of Structure in Cosmological Simulations, adviser Paul M. Ricker
M.S. Astronomy, University of Illinois at Urbana–Champaign, GPA: 3.7/4, 2004
Dipl. Astrophysics, University of Belgrade, GPA: 9.3/10, 2002

Research

Postdoctoral Researcher 2008–now
Dr. Salman Habib Los Alamos National Laboratory
Statistical framework for cosmological measureables: emulating the mass function, correlation functions, halo profiles for arbitrary set of parameters in Λ CDM cosmologies. Possibilities of detecting dynamical dark energy that evolves over time, and what are constraints on it. Development of the new cosmology code for the next-generation hybrid (cell accelerated) computer architectures, that will enable simulating volumes of the size equal to observable universe, while still resolving individual galaxies.

Research Assistant 2004–2008
Prof. Paul M. Ricker University of Illinois
Formation of structures in the Universe: accurate determination of the mass function over the large range of redshifts; effects of dark matter halo structure and halo mass definitions on cosmological parameters determination. Numerical study of statistical properties of groups and clusters of galaxies within Λ CDM cosmology. Error control, numerical issues and implementation of adaptive mesh refinement schemes in cosmological simulations. Development of subgrid models for star formation and supernovae feedback.

Visiting Code Developer Fall 2006
Dr. Anshu Dubey ASC Center for Thermonuclear Flashes
Porting the cosmology module to FLASH 3 code – a modular, adaptive-mesh, parallel simulation code capable of handling compressible fluid flows, as well as self-gravitating particles. Tests of multigrid and multipole Poisson solver for adaptive meshes.

Teaching

- Teaching Assistant, Stars and Galaxies, University of Illinois, Spring 2004
- Teaching Assistant, Solar System, University of Illinois, Fall 2003
- Teaching Assistant, Introduction to Astronomy, University of Illinois, Spring 2003

Fellowships and Grants

- Grants-in-Aid of Research support from the National Academy of Sciences, administered by Sigma Xi, The Scientific Research Society, 2004
- University of Illinois Astronomy Department Fellowship, Fall 2002

Professional Societies

- American Physical Society
- American Astronomical Society
- Society for Industrial and Applied Mathematics (SIAM)

Refereed Publications

1. U. Alam, Z. Lukić, S. Bhattacharya, *Galaxy Clusters as a Probe of Early Dark Energy*, 2010, The Astrophysical Journal, submitted, arXiv:1004.0437
2. A. Pope, S. Habib, Z. Lukić, D. Daniel, P. Fasel, N. Desai, and K. Heitmann: *The Accelerated Universe*, 2010, Computing in Science & Engineering, accepted
3. M. White et al.: *Particle mesh simulations of the Lyman-alpha forest and the signature of Baryon Acoustic Oscillations in the intergalactic medium*, 2010, The Astrophysical Journal, 713, 383
4. S. Habib, A. Pope, Z. Lukić and 9 coauthors: *Hybrid petacomputing meets cosmology: The Roadrunner Universe project*, 2009, Journal of Physics, 180, 012019
5. Z. Lukić, D. Reed, K. Heitmann, and S. Habib: *The Structure of Halos: Implications for Group and Cluster Cosmology*, 2009, The Astrophysical Journal, 692, 217
6. K. Heitmann, Z. Lukić and 12 coauthors: *The Cosmic Code Comparison Project*, 2008, Computational Science and Discovery, 1, 5003
7. Z. Lukić, K. Heitmann, S. Habib, S. Bashinsky, P. M. Ricker: *The Halo Mass Function: High Redshift Evolution and Universality*, 2007, The Astrophysical Journal, Volume 671, Issue 2, pp. 1160-1181
8. K. Heitmann, Z. Lukić, S. Habib, P. M. Ricker: *Capturing Halos at High Redshifts*, 2006, The Astrophysical Journal, Volume 642, Issue 2, pp. L85-L88

Presentations

- Cosmology with Galaxy Clusters: Early Dark Energy*, Snowcluster conference, Utah, 2010
- Dark Matter Halo Structure*, Santa Fe Cosmology Workshop, 2009
- Structure Formation and Cosmological Parameters*, Colloquium, Institute of Physics, Belgrade, 2008
- Formation of Structure in the Universe*, Astrophysics Colloquium, University of Belgrade, 2008
- Halo Structure and Cluster Cosmology*, Cosmic Web, NRAO, 2008
- Constraining Cosmological Parameters with Galaxy Cluster Counts*, New Mexico Symposium, NRAO, 2007
- Evolution of the Mass Function*, Great Lakes Cosmology Workshop, 2007
- Halo Mass Function at High Redshifts*, Santa Fe Cosmology Workshop, 2006
- Intracluster Light From Merger Simulations*, Cosmology Day at Los Alamos, 2005

Workshops Organized

- Santa Fe Cosmology Workshop*, Santa Fe, 2009
- Santa Fe Cosmology Workshop*, Santa Fe, 2008

Numerical Schools Attended

- The DOE Advanced Computational Software Collection Workshop*, Lawrence Berkeley National Laboratory, 2005
- FLASH Code Tutorial*, University of Chicago, 2004

Computer Expertise

Systems: Linux/Unix, MacOS, Windows

Programming: C/C++, Fortran, IDL, Pascal/Delphi

Parallel paradigms: OpenMP, MPI, DaCS

Experience: 18 years of programming experience;
12 years of numerical/scientific programming;
8 years of experience programming and utilizing massively parallel systems (up to 100,000 processing cores), with both shared and distributed memory.

Languages

Serbian (native), English (fluent), Spanish (basic)

Zarija Lukić

References

Available upon request