

Vera Gluscevic

Curriculum Vitae

University of Southern California
825 Bloom Walk, ACB 439
Los Angeles, CA 90089, USA
☎ +1 (213) 740 1140
✉ vera.gluscevic@usc.edu

Research Interests

Cosmological and astrophysical probes of new physics; fundamental nature of dark matter and dark energy; dark matter direct detection; cosmic microwave background theory and analysis; near-field cosmology; 21-cm cosmology; forward modeling and inference in physics.

Appointments

- 2019–Present **University of Southern California, Department of Physics and Astronomy, Los Angeles, CA.**
- Gabilan Assistant Professor
- 2018–2019 **University of Florida, Department of Physics, Gainesville, FL.**
- Assistant Professor
- 2018–2019 **Princeton University, Department of Physics, Princeton, NJ.**
- Visiting Research Scholar
- 2013–2018 **Institute for Advanced Study, Princeton, NJ.**
- Postdoctoral Member
 - Eric Schmidt Fellow (2016-2018)
 - Maternity leave (summer 2013; spring 2017)

Education

- June 2013 **Ph.D. in Astrophysics, California Institute of Technology, Pasadena, CA.**
- Thesis: *CMB as a Probe of New Physics and Old Times.*
 - Adviser: Prof. Marc Kamionkowski.
- June 2007 **B.S. in Astrophysics, University of Belgrade, Belgrade, Serbia.**
- Award “Prof. Zaharije Brkic” for The Best Student (class of 2007).
 - Faculty for Mathematics Award for Excellence in Studies (2004; 2005).
 - Serbian Ministry of Education and Faculty for Mathematics Excellence Award (2006).

Professional Service and Leadership

- 2018–Present **CMB-S4 Collaboration, community-wide effort to design the next-generation ground-based cosmic microwave background experiment.**
- Member of the Science Council
 - Lead of the Dark Matter working group

- 2018–Present **Simons Observatory Collaboration.**
- Analysis pipeline development co-lead
 - Likelihood and Theory working group co-lead
- 2019 **Astro2020 Decadal Survey**, *community input coordination.*
- **Principal author of science white paper** “Cosmological Probes of Dark Matter Interactions: The Next Decade”, submitted to the National Academies, March 2019 [ArXiv:1903.05140].
 - Key contributor to four science white papers, submitted to the National Academies, March 2019. (https://sites.nationalacademies.org/SSB/CurrentProjects/SSB_185159)
 - Key contributor to three project white papers (Simons Observatory, CMB-S4, PICO).
- 2013–Present **Journal referee:** Physical Review D, Physical Review Letters, Journal of Cosmology and Astroparticle Physics.
- 2015–2018 **IAS Committee on Diversity**, member.
- 2016 **NSF astrophysics grant proposal review**, panelist.

Teaching and Mentoring

- 2019 **Ph.D. student project advisor.**
- Student: Ethan Nadler (Stanford).
 - Publication: *Constraints on Dark Matter Microphysics from the Milky Way Satellite Population*, ApJ Letters (2019) [ArXiv:1904.10000]
 - **Article featured in AAS Nova Highlights** (September 2019).
- 2017-2018 **Ph.D. student project advisor.**
- Student: Zack Li (Princeton).
 - Publication: *Disentangling Dark Physics with Cosmic Microwave Background Experiments*, PRD (2018) [ArXiv:1806.10165]
- 2016 **Ph.D. student project advisor.**
- Student: Samuel Witte (UCLA).
 - Publication: *Prospects for Distinguishing Dark Matter Models Using Annual Modulation*, JCAP (2017) [ArXiv:1612.07808].
- Summer 2015-2018 **Undergraduate Summer Research Program (USRP)**, *Department of Astrophysical Sciences, Princeton University*, Student Project Adviser.
- Aizhan Akhmetzhanova (*Non-linearities in interacting cosmologies*; Summer/Fall 2018.)
 - Emery Trott (*CMB-S4 sensitivity to dark matter interactions*; Summer 2017.)
 - Katelyn Neese (*Annual modulation as a model-selection tool*; Summer/Fall 2015.)
- 2011-2013 **Astronomy peer mentoring program**, *California Institute of Technology.*
- Mentored junior grad students: Melodie Kao, Io Kleiser.
- Summer 2010 **Summer Undergraduate Research Fellowship (SURF) Program**, *California Institute of Technology.*
- Co-advised student: Jason Sanders (*Constraining cosmic birefringence with AGN.*)
- Summer 2010 **Instructor for a Summer course on “Forces and Rocketry”**, *Wilson Middle School in Pasadena, CA.*

- 2008-2011 **Teaching assistant**, *California Institute of Technology*.
- Ay101: *Physics of Stars*, Fall 2008, Prof. L. Hillenbrand.
 - Prepared solutions, held office hours, graded problem sets.
 - Ay21: *Galaxies and Cosmology*, Winter 2008, Prof. C. Steidel.
 - Held office hours, graded problem sets, organized material reviews.
 - Ay1: *The Evolving Universe*, Spring 2009, Prof. N. Scoville.
 - Section Instructor: *Astrobiology*.
 - Ph1: *Introductory Course in Newtonian Mechanics*, Fall 2009, Prof. J. Zmuidzinas.
 - Graded problem sets and quizzes.
 - Ph1: *Introductory Course in Newtonian Mechanics*, Fall 2010, Prof. J. Zmuidzinas.
 - Section instructor.

Outreach

- March 2018 IAS After Hours Conversations, talk: *Did we discover evidence for dark matter collisions at the dawn of first stars?*
- October 2016 Lunch with a Member, talk for the Friends of the IAS: *Cosmic microwave background: a cosmologist's discovery tool*.
- March 2016 IAS After Hours Conversations, talk: *What is dark matter?*
- September 2015 IAS Staff Welcome Reception, presentation on current research.
- December 2014 Princeton Amateur Astronomer's Association (AAAP), public talk: *How do you "catch" dark matter?*
- August 2013 Public lecture, Belgrade Planetarium, Serbia: *Glow of the past: Story of the CMB (Sjaj proslosti: Prica o mikrotalasnoj kosmickoj pozadini)*.
- Spring 2012 "The 2012 Venus Transit at Caltech" public outreach program: volunteer.
- Summer 2009 "Letenka" astronomy summer camp, Fruska Gora, Serbia: Invited consultation session for Serbian undergraduates interested in studying abroad.
- 2003-2013 Magazine "Astronomija" for popularization of Astronomy and Science, Novi Sad, Serbia: columnist and foreign correspondent.
- 2001-2003 Belgrade Public Observatory and Planetarium, Serbia: junior assistant.

Recent Invited Talks

- Aug. 2019 LSST Dark Matter Workshop, University of Chicago; Title: *Cosmological probes of dark matter interactions*.
- Jun. 2019 New Directions in the Search for Light Dark Matter Particles, Conference, Fermilab; Title: *Cosmological probes of dark matter interactions*.
- Jan. 2019 Dunlap Institute Colloquium, University of Toronto; Title: *Dark matter throughout cosmic history*.
- Jan. 2019 USC Department of Physics and Astronomy Colloquium; Title: *Dark matter throughout cosmic history*.

- Dec. 2018 CITA seminar, University of Toronto; Title: *Cosmological Tests of Dark Matter Physics*.
- Nov. 2018 KIPAC seminar, Stanford; Title: *Cosmological Probes of Dark Matter Interactions*.
- Nov. 2018 Nu physics in the CMB (workshop/conference), UC San Diego; Title: *Dark matter in the CMB and the lab*.
- Aug. 2018 Particle Physics and Cosmology Conference, Zurich; Title: *Cosmological probes of dark matter physics*.
- May 2018 CIPANP Conference, Palm Springs; Title: *Cosmological searches for dark matter-baryon interactions*.
- May 2018 UCSB Astrophysics Colloquium; Title: *Cosmological searches for dark matter*.
- Apr. 2018 Dark matter detection and detectability: paradigm confirmation or shift?, KITP, Santa Barbara; Title: *Cosmological searches for dark matter-baryon interactions*.
- Apr. 2018 Princeton University Gravity Group Seminar; Title: *Cornering dark matter*.
- Feb. 2018 University of Florida Physics Colloquium; Title: *Cornering dark matter*.

Computer Skills and Code

Proficient in Python, Cython, C, Mathematica, MATLAB. Experience with MultiNest, HEALPix, CAMB, 21CMFast, CosmoMC, CLASS, Monte Python. Open source code available at <https://github.com/veragluscevic/>.

References

Prof. Marc Kamionkowski (kamion@pha.jhu.edu)
 Prof. Jo Dunkley (jdunkley@princeton.edu)
 Prof. Annika Peter (peter.33@osu.edu)
 Prof. Christopher Hirata (hirata.10@osu.edu)
 Prof. Robert Caldwell (robert.r.caldwell@dartmouth.edu)

Selected Publications (chronological order)

- Ethan O. Nadler, **Vera Gluscevic**, Kimberly K. Boddy, and Risa H. Wechsler. *Constraints on Dark Matter Microphysics from the Milky Way Satellite Population*. The Astrophysical Journal Letters, Volume 878, Issue 2, article id. L32, 6 pp. (2019). [ArXiv:1904.10000]; citations: 13.
- Alex Drlica-Wagner et al (including key contribution from **Vera Gluscevic**). *Probing the Fundamental Nature of Dark Matter with the Large Synoptic Survey Telescope*. White paper (2019) [ArXiv:1902.01055]; citations: 16.
- Principal author: **Vera Gluscevic**. *Cosmological Probes of Dark Matter Interactions: The Next Decade*. Astro2020 Decadal Survey Science White Paper, submitted to the National Academies (2019) [ArXiv:1903.05140]; citations: 4.
- The Simons Observatory: Science goals and forecasts (including **Vera Gluscevic**). Journal of Cosmology and Astroparticle Physics, Issue 02, article id. 056 (2019) [ArXiv:1808.07445]; citations: 123.

- Kimberly K. Boddy, **Vera Gluscevic**, Vivian Poulin, Ely D. Kovetz, Marc Kamionkowski, and Rennan Barkana. *A Critical Assessment of CMB Limits on Dark Matter-Baryon Scattering: New Treatment of the Relative Bulk Velocity*. Physical Review D, Volume 98, Issue 12, id.123506 (2018) [ArXiv:1808.00001]; citations: 30.
- Ely D. Kovetz, Vivian Poulin, **Vera Gluscevic**, Kimberly K. Boddy, Marc Kamionkowski, and Rennan Barkana. *Tighter Limits on Dark Matter Explanations of the Anomalous EDGES 21cm Signal*. Physical Review D, Volume 98, Issue 10, id.103529 (2018) [ArXiv:1807.11482]; citations: 39.
- Kimberly K. Boddy and **Vera Gluscevic**. *First Cosmological Constraint on Dark Matter Effective Theory*. Physical Review D, Volume 98, Issue 8, id.083510 (2018) [ArXiv:1801.08609]; citations: 29.
- **Vera Gluscevic** and Kimberly K. Boddy. *Constraints on Scattering of keV-TeV Dark Matter with Protons in the Early Universe*. Physical Review Letters, Volume 121, Issue 8, id.081301 (2018). [ArXiv:1712.07133]; citations: 48.
- CMB-S4 collaboration (including key contribution from **Vera Gluscevic**). *CMB-S4 Science Book, First Edition*. White paper (2016) [ArXiv:1610.02743]; citations: 550.
- **Vera Gluscevic**, Tejaswi Venumadhav, Xiao Fang, Christopher M. Hirata, Antonija Oklopčić, and Abhilash Mishra. *A new probe of magnetic fields in the pre-reionization epoch: II. Detectability*. Physical Review D, Volume 95, Issue 8, id.083011 (2017). [ArXiv:1604.06327]; citations: 7.
- **Vera Gluscevic**, Moira I. Gresham, Samuel D. McDermott, Annika H. G. Peter, and Kathryn M. Zurek. *Identifying the Theory of Dark Matter with Direct Detection*. Journal of Cosmology and Astroparticle Physics, Issue 12, article id. 057 (2015). [ArXiv:1506.04454]; citations: 35.
- **Vera Gluscevic** and Annika H.G. Peter. *Understanding WIMP-baryon interactions with direct detection: a roadmap*. Journal of Cosmology and Astroparticle Physics, Issue 09, article id. 040, (2014). [ArXiv:1406.7008]; citations: 23.
- Annika H.G. Peter, **Vera Gluscevic**, Anne M. Green, Bradley J. Kavanagh, and Samuel K. Lee. *WIMP physics with ensembles of direct-detection experiments*. Physics of the Dark Universe, Volume 5, p. 45-7 (2014) [ArXiv:1310.7039]; citations: 66.
- **Vera Gluscevic**, Duncan Hanson, Marc Kamionkowski, and Christopher M. Hirata. *First CMB Constraints on Direction-Dependent Cosmological Birefringence from WMAP-7*. Physical Review D, vol. 86, Issue 10, id. 103529 (2012). [ArXiv:1206.5546]; citations: 40.
- Robert Caldwell, **Vera Gluscevic**, and Marc Kamionkowski. *Cross-correlation of cosmological birefringence with CMB temperature*. Physical Review D, vol. 84, Issue 4, id. 043504 (2011) [pages 1-9]. [ArXiv:1104.1634]; citations: 27.
- **Vera Gluscevic** and Marc Kamionkowski. *Testing parity-violating mechanisms with cosmic microwave background experiments*. Physical Review D, vol. 81, Issue 12, id. 123529 (2010) [ArXiv:1002.1308]; citations: 67.
- **Vera Gluscevic**, Marc Kamionkowski, and Asantha Cooray. *Derotation of the cosmic microwave background polarization: Full-sky formalism*. Physical Review D, vol. 80, Issue 2, id. 023510 (2009) [ArXiv:0905.1687]; citations: 53.