**M. Sten Delos**

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**RESEARCH INTERESTS**January 8, 2021

Dark matter and the dynamics of self-gravitating systems

Origins of matter and structure in the Universe

**PROFESSIONAL EXPERIENCE**

Sept. 2020-present**Max Planck Institute for Astrophysics** [Garching, Germany]  
Postdoctoral Fellow

**EDUCATION**

May 2020**University of North Carolina at Chapel Hill** [Chapel Hill, NC, USA]  
Ph.D. in Physics  
Thesis: “Probing the early universe using dark matter minihalos”  
Advisor: Adrienne Erickcek

May 2015**State University of New York at Stony Brook** [Stony Brook, NY, USA]  
M.A. in Physics

May 2010**University of Virginia** [Charlottesville, VA, USA]  
B.S. in Physics and Mathematics *with Highest Distinction*

**HONORS**

2019 Dissertation Completion Fellowship (UNC-Chapel Hill)

2019 North Carolina Space Grant Graduate Research Fellowship

2019 Kenan Trust Graduate Student Research Grant (UNC-Chapel Hill)

2010 Sigma Pi Sigma Physics Honor Society

**PROFESSIONAL ACTIVITIES AND SERVICE**

2020 Referee for *Monthly Notices of the Royal Astronomical Society*

2018 Visiting Scholar at The Ohio State University

2017 University of North Carolina at Chapel Hill  
Senior graduate student pre-candidacy mentoring team

**INVITED PRESENTATIONS**

“Probing cosmology using dark matter microhalos.” Joint Cambridge-LMU online cosmology workshop; January 2021.

“Probing cosmology using dark matter microhalos.” Fermilab CPC Seminar; Batavia, IL, USA; November 2020.

“Predicting the dark matter distribution at the smallest scales.” Munich/Garching *Dark Matter Day* mini-workshop; Garching, Germany; October 2020.

“The first dark matter halos as probes of cosmology.” Institute Seminar at the Max Planck Institute for Astrophysics; Garching, Germany; October 2020.

“Probing cosmology using dark matter microhalos.” Seminar at the Perimeter Institute; Waterloo, ON, Canada; February 2020.

**PUBLICATION LIST**

*Submitted Journal Articles*

Rouzbeh Allahverdi, Mustafa A. Amin, Asher Berlin, Nicolás Bernal, Christian T. Byrnes, **M. Sten Delos**, Adrienne L. Erickcek, Miguel Escudero, Daniel G. Figueroa, Katherine Freese, *et al*. “The First Three Seconds: a Review of Possible Expansion Histories of the Early Universe.” Submitted to *The Open Journal of Astrophysics* August 2020 [[arXiv:2006.16182](https://arxiv.org/abs/2006.16182)].

*Refereed Journal Articles*

**M. Sten Delos**, Tim Linden, and Adrienne L. Erickcek. “Breaking a dark degeneracy: The gamma-ray signature of early matter domination.” *Phys. Rev. D* **100**, 123546 (2019) [[arXiv:1910.08553](https://arxiv.org/abs/1910.08553)].

Carlos Blanco, **M. Sten Delos**, Adrienne L. Erickcek, and Dan Hooper. “Annihilation signatures of hidden sector dark matter within early-forming microhalos.” *Phys. Rev. D* **100**, 103010 (2019) [[arXiv:1906.00010](https://arxiv.org/abs/1906.00010)].

**M. Sten Delos**. “Evolution of dark matter microhalos through stellar encounters.” *Phys. Rev. D* **100**, 083529 (2019) [[arXiv:1907.13133](https://arxiv.org/abs/1907.13133)].

**M. Sten Delos**. “Tidal evolution of dark matter annihilation rates in subhalos.” *Phys. Rev. D* **100**, 063505 (2019) [[arXiv:1906.10690](https://arxiv.org/abs/1906.10690)].

**M. Sten Delos**, Margie Bruff, and Adrienne L. Erickcek. “Predicting the density profiles of the first halos.” *Phys. Rev. D* **100**, 023523 (2019) [[arXiv:1905.05766](https://arxiv.org/abs/1905.05766)].

**M. Sten Delos**, Adrienne L. Erickcek, Avery P. Bailey, and Marcelo A. Alvarez. “Density profiles of ultracompact minihalos: Implications for constraining the primordial power spectrum.” *Phys. Rev. D* **98**, 063527 (2018) [[arXiv:1806.07389](https://arxiv.org/abs/1806.07389)].

**M. Sten Delos**, Adrienne L. Erickcek, Avery P. Bailey, and Marcelo A. Alvarez. “Are ultracompact minihalos really ultracompact?” *Phys. Rev. D Rapid Communications* **97**, 041303(R) (2018) [[arXiv:1712.05421](https://arxiv.org/abs/1712.05421)].

*Conference Presentations*

**M. Sten Delos**, Adrienne L. Erickcek, and Tim Linden. “The gamma-ray signature of an early matter-dominated era.” *APS April Meeting* (2019).

**M. Sten Delos**, Adrienne L. Erickcek, and Tim Linden. “The gamma-ray signature of an early matter-dominated era.” *Eighth International Fermi Symposium* (2018).

**M. Sten Delos**, Adrienne L. Erickcek, Avery P. Bailey, and Marcelo A. Alvarez. “Accurately constraining the primordial power spectrum using minihalos.” *APS April Meeting* (2018).

**TEACHING EXPERIENCE**

**University of North Carolina at Chapel Hill** [Chapel Hill, NC, USA]

Spring 2019 Cosmology (TA)

Fall 2017 Graduate Quantum Mechanics I (TA)

Summer 2017 Introductory Calculus-based Electromagnetism and Quanta (TA)

Spring 2017 Introductory Calculus-based Electromagnetism and Quanta (TA)

Fall 2016 Introductory Calculus-based Mechanics and Relativity (TA)

**Guilford Technical Community College** [Jamestown, NC, USA]

Spring 2016 Conceptual Physics

**State University of New York at Stony Brook** [Stony Brook, NY, USA]

Spring 2012 Physics for Life Sciences I (TA)

Fall 2011 Physics for Life Sciences II (TA)

Spring 2011 Physics for Life Sciences II (TA)

Fall 2010 Physics for Life Sciences I (TA)