ATAKAN HILMI FIRAT

Center for Quantum Mathematics and Physics (QMAP), UC Davis, 95616, USA
+1 (857) 777-9546 ⋄ ahfirat@ucdavis.edu ⋄ atakanhilmifirat.com
Inspire HEP ⋄ arXiv ⋄ Google Scholar

RESEARCH INTERESTS

Theoretical high energy physics, string theory, and string field theory. I am currently interested in getting physical predictions out of closed string field theory using hyperbolic geometry.

ACADEMIC POSITIONS

QMAP, University of California Davis, *Sep 2024 - current*
Postdoctoral Scholar

EDUCATION

Massachusetts Institute of Technology, *Aug 2019 - May 2024*
Ph.D. in Physics,
Thesis: "Hyperbolic String Field Theory",
Advisor: Barton Zwiebach,
GPA: 5.00/5.00.

University of Colorado Boulder, *Aug 2015 - May 2019*
B.A. in Physics and Mathematics,
Summa Cum Laude with distinction,
Thesis: "Local Holographic Superconductors and Hovering Black Holes",
Advisor: Oliver DeWolfe,
GPA: 4.00/4.00, graduated as valedictorian.

PUBLICATIONS

[1] **Atakan Hilmi Fırat** and Nico Valdes-Meller. "Topological recursion for hyperbolic string field theory". In: (Sept. 2024). arXiv: 2409.02982 [hep-th].

[2] **Atakan Hilmi Fırat**. "A_∞ perspective to Sen's formalism". In: *Nucl. Phys. B* 1008 (2024), p. 116691. DOI: 10.1016/j.nuclphysb.2024.116691. arXiv: 2405.05310 [hep-th].

[3] Theodore Erler and **Atakan Hilmi Fırat**. "Wilsonian effective potentials and closed string field theory". In: *JHEP* 02 (2024), p. 018. DOI: 10.1007/JHEP02(2024)018. arXiv: 2311.17322 [hep-th].

[4] **Atakan Hilmi Fırat**. "String vertices for the large N limit". In: *Nucl. Phys. B* 1000 (2024), p. 116485. DOI: 10.1016/j.nuclphysb.2024.116485. arXiv: 2311.00747 [hep-th].

[5] Harold Erbin and **Atakan Hilmi Fırat**. "Open string stub as an auxiliary string field". In: *SciPost Phys.* 17 (2024), p. 044. DOI: 10.21468/SciPostPhys.17.2.044. arXiv: 2308.08587 [hep-th].

[6] **Atakan Hilmi Fırat**. "Hyperbolic string tadpole". In: *SciPost Phys.* 15.6 (2023), p. 237. DOI: 10.21468/SciPostPhys.15.6.237. arXiv: 2306.08599 [hep-th].

[7] **Atakan Hilmi Fırat**. "Bootstrapping closed string field theory". In: *JHEP* 05 (2023), p. 186. DOI: 10.1007/JHEP05(2023)186. arXiv: 2302.12843 [hep-th].

[8] Harold Erbin and **Atakan Hilmi Fırat**. "Characterizing 4-string contact interaction using machine learning". In: *JHEP* 04 (2024), p. 016. DOI: 10.1007/JHEP04(2024)016. arXiv: 2211.09129 [hep-th].

[9] Sergei Alexandrov, **Atakan Hilmi Fırat**, Manki Kim, Ashoke Sen, and Bogdan Stefański. "D-instanton induced superpotential". In: *JHEP* 07 (2022), p. 090. DOI: 10.1007/JHEP07(2022)090. arXiv: 2204.02981 [hep-th].

[10] Harold Erbin, **Atakan Hilmi Fırat**, and Barton Zwiebach. "Initial value problem in string-inspired nonlocal field theory". In: *JHEP* 01 (2022), p. 167. DOI: 10.1007/JHEP01(2022)167. arXiv: 2111.03672 [hep-th].

[11] **Atakan Hilmi Fırat**. "Hyperbolic three-string vertex". In: *JHEP* 08 (2021), p. 035. DOI: 10.1007/JHEP08(2021)035. arXiv: 2102.03936 [hep-th].

SCHOLARSHIPS, HONORS, AND CERTIFICATES

Presidential Graduate Fellowship Award, MIT.	*Oct 2019*
Stephen Hilley White Undergraduate Research Award, University of Colorado Boulder.	*May 2019*
Chancellor's Recognition Award, University of Colorado Boulder.	*May 2019*
GRE Physics 990/990.	*Sep 2018*
George and Clara Moreno Scholarship, University of Colorado Boulder.	*Aug 2017*

INVITED TALKS AND POSTERS

Topological recursion for hyperbolic string field theory, *ICTS String Seminars (Online).*	*Oct 2024*
String Field Theory: An Introduction, *UC Davis Mathematical Physics Seminar, Davis CA, USA.*	*Sep 2024*
Recent Developments in (Hyperbolic) String Vertices, *At the Interface of Physics, Mathematics, and AI, Pollica, Italy.*	*June 2023*
Recent Developments in (Hyperbolic) String Vertices, *CEA-LIST, Paris, France.*	*May 2023*
Hyperbolic String Vertices, *Matrix Models and String Field Theory, Benasque, Spain.*	*May 2023*
Bootstrapping Closed String Field Theory, *ICTS String Seminars (Online).*	*Apr 2023*
Characterizing 4-string Contact Interaction Using Machine Learning, *SITP Colloquia, Stanford University, Palo Alto CA, USA.*	*Nov 2022*
Characterizing 4-string Contact Interaction Using Machine Learning, *SFT 2022, FZU, Prague, Czechia.*	*Sep 2022*
D-instanton Induced Superpotential, *Poster, Strings 2022, University of Vienna, Vienna, Austria.*	*July 2022*

D-instanton Induced Superpotential, *May 2022*
SFT Journal Club (Online).

D-instanton Superpotential in Type II String Theory on Calabi-Yau Orientifolds, *Mar 2022*
Seminar Series on String Phenomenology (Online).

D-instanton Superpotential in Type II String Theory on Calabi-Yau Orientifolds, *Mar 2022*
Particle Theory Seminar, Cornell University, Ithaca NY USA.

Initial Value Problem and Causality in String-Inspired Non-local Field Theory, *Sep 2021*
SFT@Cloud 2021 (Online).

Hyperbolic Three-String Vertex, *June 2021*
Poster, Strings 2021, ICTP-SAIFR, Sao Paulo, Brazil (Online).

TEACHING AND MENTORING

Quantum Field Theory II, Teaching Assistant, MIT. *Fall 21, 22, 23*

Quantum Field Theory III, Teaching Assistant, MIT. *Spring 21, 23*

Directed Reading Program in Physics, Mentor, MIT. *Winter 21, 22*

Graduate Quantum Mechanics I, Teaching Assistant, MIT. *Fall 20*

Classical Mech. and Math. Methods II, Learning Assistant, University of Colorado Boulder. *Spring 19*

Foundations of Modern Physics, Learning Assistant, University of Colorado Boulder. *Fall 17*

Analysis I, Grader, University of Colorado Boulder. *Spring 17*

Precalculus Mathematics, Grader, University of Colorado Boulder. *Fall 16*

SERVICE AND OUTREACH

Member of MSRP Physics Application Review Committee, MIT. *Winter 23*

MIT Physics Graduate Students Friday Social, Chair, MIT. *Fall 22*

CTP Graduate Student Faculty Search Committee, Committee Head, MIT. *Fall 21*