

# Soner Albayrak

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## ACADEMIC POSITIONS

### Middle East Technical University, Ankara, Turkey

Doktor Öğretim Üyesi (Assistant Professor)

Oct 2023 - present

Ek Görevli Öğretim Görevlisi (Part Time Lecturer)

Sep 2023 - Oct 2023

### University of Amsterdam, Amsterdam, Netherlands

Onderzoeker (Researcher)

Sep 2021 - Sep 2023

(Contact: Daniel Baumann)

### National Taiwan University, Taipei, Taiwan

Visiting Researcher

Apr 2023 - Jun 2023

(Contact: Yu-tin Huang)

## ACADEMIC AND PROFESSIONAL PREPARATION

### Yale University, New Haven, USA

Doctor of Philosophy in Physics

Agu 2016 - Jun 2021

(Advisor: David Poland)

Dissertation title: *Analytic Studies of Fermions in the Conformal Bootstrap*

Master of Philosophy in Physics

Master of Science in Physics

### California Institute of Technology, Pasadena, USA

Visiting Student Researcher

Jul 2018 - Jun 2019

(Host: David Simmons Duffin)

Simons Bootstrap Collaboration Graduate Student Exchange

### Middle East Technical University, Ankara, Turkey

Master of Science in Physics

Sep 2008 - Feb 2016

(Advisor: İsmail Turan)

Thesis: *A Lorentz Violating Theory: Its Nonminimal Extension in the Photon Sector*

Bachelor of Science in Physics

Bachelor of Science in Electrical & Electronics Engineering

## CURRENT RESEARCH INTERESTS

Conformal bootstrap

AdS/CFT

Cosmological bootstrap

Scattering amplitudes

## PEER REVIEWED PUBLICATIONS

**S. Albayrak** and S. Kharel, *All plus four point (A)dS graviton function using generalized on-shell recursion relation*, [JHEP 05 \(2023\) 151](#)

**S. Albayrak**, Rajeev Erramilli, Zhijin Li, David Poland and Yuan Xin, *Bootstrapping  $N_f = 4$  conformal  $QED_3$* , [Phys.Rev.D 105 \(2022\)](#)

**S. Albayrak**, S. Kharel and D. Meltzer, *On duality of color and kinematics in (A)dS momentum space*, [JHEP 03 \(2021\) 249](#)

**S. Albayrak**, C. Chowdhury and S. Kharel, *On loop celestial amplitudes for gauge theory and gravity*, [Phys.Rev.D 102 \(2020\)](#)

**S. Albayrak** and S. Kharel, *Spinning loop amplitudes in Anti-de Sitter space*, [Phys.Rev.D 103 \(2021\) 2](#)

**S. Albayrak**, D. Meltzer and D. Poland, *The Inversion Formula and 6j Symbol for 3d Fermions*, [JHEP 09 \(2020\) 148](#)

**S. Albayrak**, C. Chowdhury and S. Kharel, *Study of momentum space scalar amplitudes in AdS spacetime*, [Phys.Rev.D 101 \(2020\) 12](#)

**S. Albayrak** and S. Kharel, *Towards the higher point holographic momentum space amplitudes. Part II. Gravitons*, [JHEP 12 \(2019\) 135](#)

**S. Albayrak**, C. Chowdhury and S. Kharel, *New relation for Witten diagrams*, [JHEP 10 \(2019\) 274](#)

**S. Albayrak**, D. Meltzer and D. Poland, *More Analytic Bootstrap: Nonperturbative Effects and Fermions*, [JHEP 08 \(2019\) 040](#)

**S. Albayrak** and S. Kharel, *Towards the higher point holographic momentum space amplitudes*, [JHEP 02 \(2019\) 040](#)

#### CONFERENCES & PRESENTATIONS

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Conformal Bootstrap Annual Meeting, Simons Foundation - New York	Nov 2023
Fuzzy Sphere Meets Bootstrap, SCGP-Stony Brook	Nov 2023
Bootstrap 2023, ICTP – SAIFR	Jul 2023
National Taiwan University, seminar Invited Talk: <i>A geometric approach to the perturbative unitarity in cosmology</i>	May 2023
Middle East Technical University, seminar Invited Talk: <i>Extending the flat space techniques to curved spacetimes</i>	Mar 2023
University of Amsterdam String Theory Journal Club Talk: <i>Conformal QED in 3d: The Numerical Bootstrap Approach</i>	Feb 2023
Positivity, Princeton Center for Theoretical Science	Dec 2022
Bootstrapping Nature, Galileo Galilei Institute Invited Talk: <i>Inverting the 3d Fermions</i>	Nov 2022
ATITPhysics 2022S, online school Colloquium: <i>Problems in Theoretical Physics</i>	Sep 2022
Middle East Technical University, online seminar Invited Talk: <i>Conformal QED in 3d: The Numerical Bootstrap Approach</i>	Jun 2022
20 <sup>th</sup> Workshop on Quantization, Dualities and Integrable Systems, online seminar Talk: <i>Conformal QED in 3d: The Numerical Bootstrap Approach</i>	Apr 2022
Holography@D-ITP meetings, Utrecht University Invited Talk: <i>Conformal QED in 3d: The Numerical Bootstrap Approach</i>	Apr 2022

Case Western Reserve University, online seminar Invited Talk: <i>Conformal QED in 3d: The Numerical Bootstrap Approach</i>	Apr 2022
Boundaries and Defects in CFT and Holography, online school	Mar 2022
Conformal Bootstrap Annual Meeting, Simons Foundation - New York	Nov 2021
ICTP – School on Superstring Theory and Related Topics, online school	Oct 2021
University of Amsterdam String Theory Journal Club Talk: <i>Fermions in CFTs: The Analytic Bootstrap Approach</i>	Oct 2021
International Society for Quantum Gravity, online meeting	Oct 2021
All Lambdas Holography @ Prague, online workshop	Oct 2021
ATITPhysics 2021, online school Lecture Series: <i>Conformal Symmetry in Field Theories</i>	Sep 2021
Bootstrap 2021, online conference	Jul 2021
19 <sup>th</sup> Workshop on Quantization, Dualities and Integrable Systems, online seminar Talk: <i>Fermions in CFTs: The Analytic Bootstrap Approach</i>	Apr 2021
THK University, online seminar Invited Talk: <i>Simetriler: Niçin evrenimiz böyle?</i>	Mar 2021
Porto University, online seminar Invited Talk: <i>On Witten diagrams in momentum space</i>	Feb 2021
Bootstrap 2020, online conference	Jun 2020
Middle East Technical University, online seminar Invited Talk: <i>Recent Developments in Conformal Bootstrap</i>	Nov 2020
Zoomplitudes 2020, online conference	May 2020
Online seminar series in theoretical physics in Turkey Talk: <i>Recent Developments in Conformal Bootstrap</i>	May 2020
Conformal Bootstrap Annual Meeting, Simons Foundation - New York	Nov 2019
Developments in the Numerical Bootstrap, SCGP-Stony Brook	Nov 2019
Bootstrap 2019, Perimeter Institute	Jul 2019
Bootstrap 2018, California Institute of Technology	Jul 2018
Analytic approaches to the bootstrap, Azores	May 2018
Particle theory group student talk: <i>On Wess-Zumino-Witten model</i> , Yale	Mar 2018
Signals for Nonminimal Lorentz and CPT Violation, IUCSS Poster presentation: <i>CPT-odd Photon in Vacuum-Orthogonal Model</i>	Jun 2015
Ankara High Energy Physics Days, METU Talk: <i>CPT Violating QED and Beyond</i>	Feb 2015
Recent Developments in High Energy Physics, METU	May 2013

## AWARDS AND SCHOLARSHIPS

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National Graduate Study Scholarship <i>by Scientific and Technological Research Council of Turkey</i>	2014
Graduate Courses Performance Award <i>by Middle East Technical University</i>	2014
Dean's Honor and High Honor Lists	2009-2013
Outstanding Success Scholarship's <i>by METU, by Turkish Educational Foundation, and by Ministry of Youth and Sports</i>	2008

## EXPERIENCE

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<b>Instructor</b> , Middle East Technical University	2023-current
PHYS 209: <i>Mathematical Methods in Physics I</i>	Fall 2023
PHYS 105: <i>General Physics I</i>	Fall 2023
<b>Teaching Assistant</b> , Yale University	2017-2021
PHYS 181: <i>University Physics</i>	Spring 2018, Spring 2020, Spring 2021
PHYS 180: <i>University Physics</i>	Fall 2017, Fall 2019, Summer 2020, Fall 2020
PHYS 166L: <i>General Physics Laboratory</i>	Spring 2017
<b>Teaching Assistant</b> , Middle East Technical University	2014-2016
PHYS 502: <i>Analytical Mechanics</i>	Fall 2015, Spring 2016
PHYS 408: <i>Particle Physics II</i>	Spring 2015, Spring 2016
PHYS 407: <i>Particle Physics I</i>	Fall 2014, Fall 2015
PHYS 311: <i>Classical Mechanics</i>	Fall 2014, Spring 2015, Fall 2015, Spring 2016
PHYS 105 - LAB: <i>General Physics I</i>	Fall 2014
<b>Intern</b> , PROMOD R&D Software, Ankara	Jul & Aug 2013
<i>worked for object tracking and camera calibration problems</i>	
<b>Intern</b> , SÖKTAŞ Textile, Aydın	Aug & Sep 2012
<i>worked in the control department</i>	

## OTHER ACTIVITIES

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Referee, <i>Journal of High Energy Physics</i>
Member, <i>University Forum (UVA)</i>
Organizer, <i>ATITPhysics Online School Series</i>
Advising Committee, <i>Joint Seminar Series in Theoretical Physics (Boun&amp;METU&amp;UTAA)</i>
Physics Outreach (in Turkish), <i>Evrin Ağacı</i>

## REFERENCES

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Available upon request