CURRICULUM VITAE

Alhun Aydın

Assistant Professor of Physics at Sabancı University
and Associate at Harvard University

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EMPLOYMENT

09/2023 – Present : *Assistant Professor*, Faculty of Engineering and Natural Sciences (FENS), **Sabancı University**, *Turkey*
Founder & Group Leader at Quantum Energy Research Group
09/2022 – Present : *Associate*, Department of Physics, **Harvard University**, *USA*
Heller Group Collaboration
09/2022 – 09/2023 : *Postdoctoral Researcher*, Department of Physics, **Koç University**, *Turkey*
Quantum Enabling System Technologies (QuEST) Team, *PI*: Ozgur E. Mustecaplioglu
09/2020 – 09/2022 : *Postdoctoral Fellow*, Department of Chemistry & Chemical Biology, **Harvard University**, *USA*
Heller Group, *PI*: Eric J. Heller
09/2018 – 09/2020 : *Co-Founder*, Nidle Teknoloji Ltd., *Turkey* (A blockchain-utility startup)
04/2013 – 09/2020 : *Research Assistant*, Energy Institute, **Istanbul Technical University** (ITU), *Turkey*
Nano Energy Research Group (joined in 10/2012)

ACADEMIC VISITS

08/2024 – 09/2024 : *Visiting Scientist*, Department of Physics, **Harvard University**, *USA*
Summer Research Visit
03/2019 – 06/2019 : *Visiting Research Fellow*, Institute of Chemistry, **Hebrew University of Jerusalem**, *Israel*
Fritz Haber Research Center for Molecular Dynamics, *Supervisor*: Ronnie Kosloff
06/2018 – 03/2019 : *Guest Doctoral Student*, Department of Physics & Astronomy, **Uppsala University**, *Sweden*
Materials Theory Division, Non-Equilibrium Nano-Physics, *Supervisor*: Jonas Fransson

EDUCATION

07/2014 – 09/2020 : **PhD** in *Energy Science & Technology*, Energy Institute, **Istanbul Technical University**
Ph.D Thesis: "*Quantum Shape Effects"*, [arXiv:2102.04332], *Advisor*: Altug Sisman
09/2012 – 07/2014 : **MSc** in *Energy Science & Technology*, Energy Institute, **Istanbul Technical University**
MSc. Thesis: "*On The Discrete Nature of Thermodynamics*", *Advisor*: Altug Sisman
09/2006 – 06/2011 : **BSc** in *Physics*, Department of Physics, **Koç University**
BSc. Thesis II: "*Bell's Theorem & Hidden Variable Theories*", 01/2011, *Advisor*: Tekin Dereli
BSc. Thesis I: "*Quantum Teleportation*", 05/2010, *Advisor*: Tekin Dereli

AWARDS & HONORS

- Best PhD Thesis Award, Istanbul Technical University, 2020
- Dean's Honor Roll, Koç University, (Spring 2010 & Fall 2011 Terms)
- Ranked in 3rd Place with Honors (Focus: Natural Sciences), Tan College, Bursa, 2006

FELLOWSHIPS & SCHOLARSHIPS

- Dean's Fund, Faculty of Arts and Sciences, Harvard University (1 year, 2021-2022)
- Postdoctoral Research Fellowship 2219, Scientific and Technological Research Council of Turkey, (1 year, 2021-2022)
- Israel Ministry of Foreign Affairs Scholarship, (1 year, 2018-2019)
- Scientific and Technological Research Council of Turkey (TUBITAK) Conference Travel Grant 2224-A, 2018
- 5x ITU Conference Travel Grants (2013, 2014, 2015, 2016, 2017)
- Full Merit Scholarship, Koç University, (5 years, 2006-2011)

PROJECTS & GRANTS (4)

1. Project Title : Quantum acoustics for strange metals and associated mysteries
   Role : **Principal Investigator**
   Type : Academic
   Field : Quantum Materials
   Funder : Sabanci University (President's Research Grant)
   Budget : 500.000 ₺ (~$15.000 at the time)
   Duration : 09/2024 – 09/2027 (3 years)

2. Project Title : Quantum heat engines operating with quantum shape effect
   Role : **Principal Investigator**
   Type : Academic
   Field : Quantum Thermodynamics
   Funder : Sabanci University (Integration Projects Support)
   Budget : 250.000 ₺ (~$7.500 at the time)
   Duration : 07/2024 – 07/2026 (2 years)

3. Project Title : Blockchain-integrated tethering app
   Role : Researcher
   Type : Industrial
   Field : Blockchain Utility
   Funder : TUBITAK (1512 - BiGG Technological Initiative Capital Support)
   Budget : 150.000 ₺ (~$30.000 at the time)
   Duration : 09/2018 – 09/2019 (1 year)

4. Project Title : Modernization of ITU Triga Mark-II Nuclear Research Reactor
   Role : Researcher
   Type : Academic
   Field : Nuclear Electronics
   Funder : Ministry of Development, Republic of Turkey
   Budget : 6.000.000 ₺ (~$3.000.000 at the time)
   Duration : 07/2014 – 08/2016 (2 years)

PUBLICATIONS (21)

arXiv author link

1. Y. Zhang, A. M. Graf, **A. Aydin**, J. Keski-Rahkonen and E. J. Heller, "Planckian Diffusion: The Ghost of Anderson Localization", (2024). [arXiv:2411.18768]
2. **A. Aydin**, J. Keski-Rahkonen, A. M. Graf, S. Yuan, X.-Y. Ouyang, O. E. Mustecaplioglu and E. J. Heller, "Polaron formation within quantum acoustics", (2024). [arXiv:2411.19788]
3. C. Kurt, A. Sisman and **A. Aydin**, "Shape-controlled Bose-Einstein condensation", (2024). [Submitted] [arXiv:2408.12698]
4. **A. Aydin**, J. Keski-Rahkonen and E. J. Heller, "Quantum acoustics unravels Planckian resistivity", *PNAS*, 121, 28, e2404853121, (2024) [**OA**]. [arXiv:2303.06077]
5. J. Keski-Rahkonen, X.-Y. Ouyang, S. Yuan, A. M. Graf, **A. Aydin** and E. J. Heller, "Quantum-acoustical Drude peak shift", *Phys. Rev. Lett.* 132, 186303, (2024). [**Editor's Suggestion**]. [arXiv: 2310.19143]
6. **A. Aydin** and A. Sisman, "Origin of the quantum shape effect", *Phys. Rev. E*, 108, 024105, (2023). [arXiv:2301.12551]
7. **A. Aydin**, "Spectral properties of size-invariant shape transformation", *Phys. Rev. E,* 107, 054108, (2023). [arXiv:2302.09663]
8. D. Kim, **A. Aydin**, A. Daza, K. N. Avanaki, J. Keski-Rahkonen and E. J. Heller, "Coherent charge carrier dynamics in the presence of thermal lattice vibrations", *Phys. Rev. B,* 106, 054311, (2022). [arXiv:2005.14239v4]
9. **A. Aydin**, A. Sisman, J. Fransson, A. M. Black-Schaffer and P. Dutta, "Thermodefect voltage in graphene nanoribbon junctions", *J. Phys.: Condens. Matter,* 34, 195304, (2022) [**OA**]. [arXiv:2104.12628]
10. **A. Aydin**, J. Fransson and A. Sisman, "Quantum shape oscillations in the thermodynamic properties of confined electrons in core-shell nanostructures", *J. Phys.: Condens. Matter,* 34, 025301, (2021). [arXiv:2211.02862]
11. A. Sisman, **A. Aydin** and J. Fransson, "Thermoshape effect for energy harvesting with nanostructures", *J. Phys. D: Appl. Phys,* 53*,* 375501, (2020) [**OA**]. [arXiv:1907.02819]
12. **A. Aydin**, A. Sisman and R. Kosloff, "Landauer's principle in a quantum Szilard engine without Maxwell's demon", *Entropy,* 22, 294, (2020) [**OA**], [**Featured Paper**]. [arXiv:1908.04400]
13. **A. Aydin**, J. Fransson and A. Sisman, "Thermosize voltage induced in a ballistic graphene nanoribbon junction", *J. Appl. Phys.,* 126*,* 104302*,* (2019) [**OA**], [**Editor's Pick**]. [arXiv:1905.12441]

14. **A. Aydin**, T. Oikonomou, G. B. Bagci and A. Sisman, "Discrete and Weyl density of states for photonic dispersion relation", *Phys. Scr,* 94**,** 105001*,* (2019). [arXiv:1809.03495]
15. **A. Aydin** and A. Sisman, "Quantum shape effects and novel thermodynamic behaviors at nanoscale", *Phys. Lett. A*, 383, 655-665 (2019). [arXiv:1807.02415]
16. C. Firat, A. Sisman and **A. Aydin**, "Characterization of density oscillations in confined and degenerate Fermi gases", *Mod. Phys. Lett. B,* 32, 1850393, (2018). [arXiv:1911.04258]
17. **A. Aydin** and A. Sisman, "Quantum oscillations in confined and degenerate Fermi gases. II. The phase diagram and applications of half-vicinity model", *Phys. Lett. A*, 382, 1813-1817, (2018).
18. **A. Aydin** and A. Sisman, "Quantum oscillations in confined and degenerate Fermi gases. I. Half-vicinity model", *Phys. Lett. A*, 382, 1807-1812, (2018). The version before split: "Half-vicinity model and a phase diagram for quantum oscillations in confined and degenerate Fermi gases", (2017). [arXiv:1709.01816]
19. **A. Aydin** and A. Sisman, "Discrete density of states", *Phys. Lett. A*, 380, 1236-1240, (2016). [arXiv:1602.05219]
20. **A. Aydin** and A. Sisman, "Dimensional transitions in thermodynamic properties of ideal Maxwell-Boltzmann gases", *Phys. Scr.*, 90, 045208, (2015). [arXiv:1502.07309]
21. **A. Aydin** and A. Sisman, "Discrete nature of thermodynamics in confined ideal Fermi gases", *Phys. Lett. A*, 378, 2001-2007, (2014). [arXiv:1408.1086]

INVITED TALKS (19)

1. "Wave-particle duality in condensed matter physics", Quantum Days '24, *QTurkey*, 23 Nov 2024, ITU, Istanbul, Turkey
2. "Displaced Drude peak from quantum acoustics"*, Marmara University, Department of Physics, Physics Seminar,* 15 May 2024, Istanbul, Turkey
3. "Theory and Applications of the Quantum Shape Effect", *21st Workshop on Quantization, Dualities and Integrable Systems (QDIS),* 26-27 Apr 2024, *Feza Gürsey Center for Physics and Mathematics*, Kandilli, Istanbul, Turkey
4. "Implications of Nonuniform Level Scaling for Quantum Energy Devices", [YouTube link: https://youtu.be/53_aLQ29t0M], *Quantum Energy Initiative YouTube Seminar Series,* 13 Dec 2023, Online
5. "Quantum Confinement Effect: From discrete spectrum to Nobel", (In Turkish) [YouTube link: https://youtu.be/A1n1QURHT1M], Quantum Technologies Academy, *QTurkey*, 3 Nov 2023, Online
6. "Heat Engines Driven by Quantum Shape Effect", *Mini-Workshop on Quantum Thermodynamics @ Koç University,* 25 Oct 2023, Istanbul, Turkey
7. "Academic Career and Challenges in the Field of Quantum Technologies", Invited Panelist at the Quantum Days '23, *QTurkey*, 7 Oct 2023, Online
8. "Advancing Quantum Materials and Devices: Fundamental Physics to Energy Applications", *Sabancı University, FENS Seminar*, 17 May 2023, Istanbul, Turkey
9. "Quantum Revolutions", Invited Panelist at the 14 April World Quantum Day, *QTurkey*, 14 Apr 2023, Istanbul, Turkey
10. "Universal Planckian resistivity from coherent charge carrier-lattice vibration dynamics", *Sabancı University, Physics Seminar*, 12 Apr 2023, Istanbul, Turkey
11. "Coherent state picture of charge carrier-lattice vibration dynamics", *Kobit |7> Quantum Optics and Information Meeting*, 2 Feb 2023, Eskişehir, Turkey
12. "Hearing the shapes of size-invariant quantum wells", [YouTube link: https://youtu.be/XYx0f-BWT7o], *Istanbul Mathematical Physics Days 2022*, 18 Dec 2022, Online
13. "Coherent state representation of lattice vibrations and coherent electron dynamics"*, Bilkent University, Department of Physics, Physics Seminar,* 2 Nov 2022, Ankara, Turkey
14. "Coherent Charge Carrier Dynamics under Thermal Lattice Vibrations (A new perspective for strange metals)", *Istanbul YMF (Condensed Matter Physics) Meeting, Istanbul University,* 27 Sep 2022, Istanbul, Turkey
15. "Coherent Electron Dynamics in Thermal Lattice Vibrations (A new perspective for strange metals)", *Harvard–Smithsonian Center for Astrophysics, Institute for Theoretical Atomic, Molecular and Optical Physics (ITAMP) Luncheon,* 7 Apr 2022, Cambridge, MA, USA
16. "Quantum shape effects", [YouTube link: https://youtu.be/hK5qtsibA2E], *QWorld – QTalks,* 23 Nov 2021, Online
17. "Landauer's principle in a quantum Szilard engine in the absence of an explicit Maxwell's Demon", *QuEST Journal Club Meeting, Koç University*, 17 Jan 2020, Istanbul, Turkey
18. "Quantum shape effects and novel thermodynamic behaviors at nanoscale", *QuEST Journal Club Meeting, Koç University*, 5 Jul 2019, Istanbul, Turkey
19. "The Intrinsic Discrete Nature of Thermodynamic Quantities in Fermi Gases", *Koç University, Graduate School of Sciences and Engineering, Physics Seminar,* 17 Oct 2014, Sarıyer, Istanbul, Turkey

CONFERENCE PRESENTATIONS (28)

1. **A. Aydin**, J. Keski-Rahkonen, X.-Y. Ouyang, S. Yuan, A. M. Graf, and E. J. Heller, "Quantum-acoustical displaced Drude peak", [Talk], *Türk Fizik Derneği (TFD) 40th International Physics Congress* 2-6 September 2024, Bodrum, Turkey
2. A. M. Graf, **A. Aydin**, and E. J. Heller, "Rethinking electron-lattice interactions: The coherent state framework in quantum acoustics", [Non-presenting author], *Türk Fizik Derneği (TFD) 40th International Physics Congress* 2-6 September 2024, Bodrum, Turkey
3. Y. Gediz and **A. Aydin**, "Thermoelectric Transport Properties of 5-7 Graphene with Different Tiling Geometries", [My student's talk], *18th International Nanoscience and Nanotechnology Conference*, 26-28 August 2024, Istanbul, Turkey
4. **A. Aydin**, "Nanoscale carbon-based unipolar thermoelectric junctions", [Talk], *4th National Carbon Conference*, 28-29 March 2024, Istanbul, Turkey
5. E. J. Heller, **A. Aydin**, J. Keski-Rahkonen, S. Yuan, X. Ouyang and A. Graf, "The (very late) advent of quantum acoustics with application to strange metals", [Non-presenting author], *APS March Meeting*, 4-8 March 2024, Minneapolis, Minnesota, USA
6. J. Keski-Rahkonen, **A. Aydin**, and E. J. Heller, "Twin peaks and boomerang in quantum-chaotic systems", [Non-presenting author], *APS March Meeting*, 4-8 March 2024, Minneapolis, Minnesota, USA
7. X. Ouyang, J. Keski-Rahkonen, E. J. Heller, A. Graf, **A. Aydin**, and S. Yuan, "Drude peak displacement by quantum acoustics", [Non-presenting author], *APS March Meeting*, 4-8 March 2024, Minneapolis, Minnesota, USA
8. S. Yuan, X. Ouyang, J. Keski-Rahkonen, **A. Aydin**, A. Graf and E. J. Heller, "Quantum acoustics: the coherent state formalism for electron-lattice interaction", [Non-presenting author], *APS March Meeting*, 4-8 March 2024, Minneapolis, Minnesota, USA
9. A. Graf, J. Keski-Rahkonen, **A. Aydin**, and E. J. Heller, "Genesis of pseudogaps from electron-lattice resonances", [Non-presenting author], *APS March Meeting*, 4-8 March 2024, Minneapolis, Minnesota, USA
10. **A. Aydin**, "Quantum thermal avalanche: Spectral characteristics of size-invariant variations of energy landscapes", [Talk], *APS March Meeting*, 4-8 March 2024, Minneapolis, Minnesota, USA
11. **A. Aydin**, "Implications of nonuniform level scaling for quantum energy devices", [Poster], *Quantum Energy Initiative (QEI) Workshop,* 20-24 Nov 2023, Singapore
12. **A. Aydin** and E. J. Heller, "Planckian scattering rate from coherent charge carrier-lattice vibration dynamics", [Talk], *APS March Meeting*, 5-10 March 2023, Las Vegas, Nevada, USA
13. E. J. Heller, **A. Aydin**, D. Kim, J. Keski-Rahkonen, Z. Li, H. Chen and A. Graf, "Understanding pseudogaps in high Tc materials", [Non-presenting author], *APS March Meeting*, 5-10 March 2023, Las Vegas, Nevada, USA
14. **A. Aydin**, A. Daza, D. Kim, K. N. Avanaki and E. J. Heller, "Coherent state description of lattice vibrations and high-temperature coherence effects", [Poster], *APS March Meeting*, 14-18 March 2022, Chicago, Illinois, USA
15. **A. Aydin**, A. Daza, D. Kim, K. N. Avanaki and E. J. Heller, "Electron coherence effects in the coherent state picture for electron-phonon interactions", [Online, Talk], *21th International Conference in Strongly Correlated Electron Systems* (SCES2020/21), 27 September-2 October 2021, Brazil
16. **A. Aydin**, A. Sisman and J. Fransson, "Single-material unipolar thermoelectrics at nanoscale", [Online, Poster], [YouTube link: https://youtu.be/lBdO3zSHlfo] *28th Joint Conference of the Condensed Matter Divisions of the Spanish Royal Physics Society and European Physical Society* (CMD2020GEFES), 31 August-4 September 2020, Madrid, Spain
17. A. Sisman, **A. Aydin** and J. Fransson, "The thermoshape voltage induced by quantum shape effects", [Online, Talk], *APS March Meeting*, 2-6 March 2020, Denver, Colorado, USA
18. **A. Aydin**, A. Sisman and R. Kosloff, "Landauer's principle in a quantum Szilard engine in the absence of an explicit Maxwell's Demon*"* [Poster], "Workshop on Quantum Thermodynamics for Young Scientists", 713. WE-Heraeus-Seminar, *Wilhelm und Else Heraeus-Stiftung*, 2-6 February 2020, Physikzentrum Bad Honnef, Germany
19. **A. Aydin**, J. Fransson and A. Sisman, "Quantum shape effects on thermodynamics of electrons", [Talk], *15th Joint European Thermodynamics Conference* (JETC19), 20-24 May 2019, Barcelona, Spain
20. A. Sisman, **A. Aydin** and J. Fransson, "Thermoshape potential", [Poster], *15th Joint European Thermodynamics Conference* (JETC19), 20-24 May 2019, Barcelona, Spain
21. **A. Aydin**, A. Sisman and Z. F. Ozturk, "Confinement effects on micro/nanoscale radiative heat transfer", [Talk], *29th International Symposium on Transport Phenomena* (ISTP29), 30 October-2 November 2018, Honolulu, Hawaii, USA
22. **A. Aydin** and A. Sisman, "Quantum shape effects on thermodynamic quantities" [Talk], "Quantum Science and Quantum Technologies Workshop", *International Centre for Theoretical Physics* (ICTP), 11-15 September 2017, Trieste, Italy
23. **A. Aydin** and A. Sisman, "Macroscopic quantum shape effects on thermodynamic potentials", [Talk], *14th Joint European Thermodynamics Conference* (JETC17), 21-25 May 2017, Budapest, Hungary
24. **A. Aydin** and A. Sisman, "A torque induced by matter waves as a new macroscopic quantum phenomenon", [Talk], *5th Quantum Thermodynamics Conference* (QTD5), pp: 30-31, 13-17 March 2017, Oxford, UK
25. **A. Aydin** and A. Sisman, "Phase transition of quantum oscillations in 1D Fermi gas", [Poster], *25th Sitges Conference on Statistical Mechanics: Non-equilibrium Phenomena in Confined Systems* , p: 56, 6-10 June 2016, Barcelona, Spain
26. **A. Aydin**, A. Sisman and Z. F. Ozturk, "Thermal conductivity oscillations in 2DEG", [Talk], *13th Joint European Thermodynamics Conference* (JETC15), 20-22 May 2015, Nancy, France

27. **A. Aydin** and A. Sisman, "Dimensional transition point in thermodynamic properties of Maxwell-Boltzmann gases", [Talk, Session Chair], *4th International Conference on Statistical Physics* (SigmaPhi14), pp: 7-8, 7-11 July 2014, Rhodes, Greece
28. **A. Aydin** and A. Sisman, "Discrete nature of thermodynamic properties", [Talk], *12th Joint European Thermodynamics Conference* (JETC13), pp: 425-429, 1-5 July 2013, Brescia, Italy

ORGANIZED CONFERENCES, WORKSHOPS & SCHOOLS (2)

1. "2nd Workshop on Quantum and Nano Thermodynamics", [Co-organizer], *"Quantum shape effects and novel thermodynamic behaviors at nanoscale"* [Talk], *Nano Energy Research Group* (NERG), 27-29 September 2018, Älvkarleby, Sweden
2. "Workshop on Quantum and Nano Thermodynamics", [Co-organizer], *"Nanoscale Thermodynamics-II: Quantum Shape Effects"* [Talk], *Nano Energy Research Group* (NERG), 6-8 September 2017, Energy Technopark, Energy Institute, ITU, Istanbul, Turkey

ATTENDED CONFERENCES & WORKSHOPS (4)

1. *Kobit |8> Quantum Optics and Information Meeting*, 25-26 Apr 2024, TÜBİTAK Research Center, Gebze, Kocaeli, Turkey
2. "Recent Progress in the Physics of Thermal Transport", *International Centre for Theoretical Physics* (ICTP) – *Eurasian Centre for Advanced Research* (ECAR), 17-21 July 2017, Izmir Institute of Technology, Izmir, Turkey
3. "Nanodevice Physics", *Feza Gürsey Summer and Winter Science Schools, Feza Gürsey Institute, Boğaziçi University,* 27-28 July 2015, Kandilli, Istanbul, Turkey
4. "Exact and Numerical Models of Low-Dimensional Quantum Structures", *International Advanced Research Schools in Physics* (IARS), *Institute of Theoretical and Applied Physics* (ITAP), 4-12 August 2013, Turunç, Marmaris, Turkey

DELIVERED SEMINARS & COLLOQUIA (12)

1. "Quantum shape effect: The interplay between geometry and thermodynamics", *PURE Seminar Series*, *Sabancı University*, 16 Jul 2024, Istanbul, Turkey
2. "Uncertainty principle", *NS Extra Topic Lecture Series*, *Sabancı University*, 22 May 2024, Istanbul, Turkey
3. "Quantum materials and devices", *Fundamental and Contemporary Topics in Physics*, *Sabancı University*, 12 Dec 2023, Istanbul, Turkey
4. "Real-space dynamics of a coupled electron-phonon system", *QuEST Journal Club Meeting, Koç University*, 11 Aug 2023, Istanbul, Turkey
5. "Spectral properties of size-invariant shape transformation", *QuEST Journal Club Meeting, Koç University*, 7 Apr 2023, Istanbul, Turkey
6. "Landauer's principle in a quantum Szilard engine without Maxwell's demon", *QuEST Journal Club Meeting, Koç University*, 24 Feb 2023, Istanbul, Turkey
7. "Coherent state representation of lattice vibrations and coherent charge carrier dynamics", *Koç University, Department of Physics Seminar*, 6 Dec 2022, Istanbul, Turkey
8. "From nanoscale thermodynamics to strange metals", *QuEST Journal Club Meeting, Koç University*, 16 Sep 2022, Istanbul, Turkey
9. "Quantum shape effects: The quantum-mechanical influence of geometry in the thermodynamics of confined systems", *ITU Energy Institute, PhD Thesis Workshop*, 12-13 Sep 2019, Istanbul, Turkey
10. "Quantum shape effects and novel thermodynamic behaviors at nanoscale", *Hebrew University of Jerusalem, Fritz Haber Seminar,* 20 Mar 2019, Jerusalem, Israel
11. "Quantum shape effects and novel thermodynamic behaviors at nanoscale", *Uppsala University, Department of Physics, Materials Theory Division Seminar,* 24 Oct 2018, Uppsala, Sweden
12. "Quantum shape effects on thermodynamic quantities", *ITU Energy Institute, PhD Thesis Workshop*, 28-29 Sep 2017, Istanbul, Turkey

SUPERVISED GRADUATE THESES (1)

1. Beyza Aslanbaş, MSc in Physics, "Effects of quantum confinement and correlations in heat engines", (Ongoing).

TEACHING

(U: Undergraduate course, G: Graduate course) (All courses I taught at all universities were conducted in English)

- **Sabancı University**

Fall 2024 : PHYS 411/511: *Electromagnetic Theory* (U&G)

Summer 2024 : PURE: Generalizing Weyl density of states (U)
: PURE: Thermoelectric properties of graphene polymorphs (U)
Spring 2024 : NS 101: *Science of Nature* - Universe Module: Are we alone in the Universe? (U)
: PROJ 201: *Undergraduate Project* - Hearing the shape of a drum (U)
Fall 2023 : PHYS 411/511: *Electromagnetic Theory* (U&G)

- **Koç University**

Spring 2023 : PHYS 550: *Nanoscale Thermodynamics & Transport* (G) (I designed fully from scratch and taught this course)

- **Training**

13/09/23 – 15/09/23 : *Attendee,* Workshop on Learner-Centered Approaches in College STEM Education, Sabancı University
An intensive 3-day workshop focused on active teaching/learning methods
Spring 2022 : *Guest Lecturer and Student Mentor*, PHYS 218: Quantum Chaos & Localization, Harvard University
Gave a guest lecture, prepared homeworks and mentored students
09/2013 – 09/2020 : *Teaching Assistant* – Energy Institute, Istanbul Technical University
Graduate courses: Engineering Mathematics, Physics of Solar Cells, Neutron Transport Theory
Gave problem sections, review lectures and held office hours
02/2012 – 06/2012 : *Physics Tutor* – Fen Bilimleri Dershanesi, Etiler, Istanbul
Teaching high school physics subjects

ACADEMIC SERVICE

- **Peer Reviewerships**
  Annals of Physics, Journal of Applied Physics, Physica E: Low-dimensional Systems and Nanostructures, Physical Review E, SciPost Physics
- **Sabancı University Committee Memberships**
  Graduation Ceremony Committee (2023 – Present), Outreach Committee (2024 – Present), Discipline Court (2024 – Present), Strategic Activities Committee (2024 – Present), Orientation Committee (2024 – Present).
  I regularly invite international researchers for graduate seminars.
- **Ph.D. Dissertation Committee Memberships**
  (In Process) Student: Hamideh Masouleh, Advisor: Ozgur E. Mustecaplioglu, Koç University

PRESS COVERAGE (2)

04/06/2024 **phys.org** – Study uncovers a quantum acoustical Drude peak shift in strange metals, Link: https://phys.org/news/2024-06-uncovers-quantum-acoustical-drude-peak.html

09/05/2024 **GazeteSU** – Remarkable Success from Our Faculty Member, Link: https://gazetesu.sabanciuniv.edu/en/remarkable-success-our-faculty-member

OUTREACH AND SCIENCE COMMUNICATION

- Giving invited general physics seminars and workshops for high school students (Schools: Üsküdar American Academy)
- Writing popular science articles in sarkac.org (a popular science magazine of Bilim Akademisi – Science Academy of Turkey)
- **Blochbusters** (www.blochbusters.com), 09/2020 – Present
  Co-founded an online platform to bring science & art together and to inspire students from all backgrounds to join science
- Organizing seminars and social tours for visiting researchers, Nano Energy Research Group, 2013-2020

SOCIETIES

09/2022 – Present : *Member,* Quantum Energy Initiative (QEI)
08/2018 – Present : *Member,* Quantum Transport & Thermodynamics Society (QTTS)
07/2018 – Present : *Member*, American Physical Society (APS)
07/2011 – Present : *Member*, Koç University Alumni Association (KÜME)

SKILLS

- Computer : Mathematica, MATLAB, COMSOL Multiphysics, LaTeX, Linux, Python, Kwant, QuTiP
- Languages : English (Fluent, PTE Academic: Received perfect score in all parts), German (Novice), Turkish (Native)

HOBBIES

- Music : Released a rock music album called "Zamandaki Yabancı" (Stranger in Time) in 2013
  Composing, Song-writing, Performing (Singing, playing guitars and keyboards), working on the 2nd music album
  Playing electric guitar in a rock band called Katakulli (since Sep 2023)
  Critical listening (Creator of the program called MusicCritic, where I rate songs that I listen systematically)
- Basketball : Amateur playing, Founder & Captain of San Andreas Chapullers in Ekşi Sözlük Basketball League (Seasons 3&4)
- Writing : Avant-garde humor (Writing regularly in my blog at www.serbestcigrisim.com, since 1/1/2020)
  A non-fiction book project about the philosophy of life from the perspective of science
- Reading : Mostly non-fiction, related to math, physics, philosophy, history, education, sociology
- Other : Travelling, swimming, hiking, chess

REFERENCES

- **Eric J. Heller,** email: eheller@fas.harvard.edu
  Department of Physics and Department of Chemistry & Chemical Biology, Harvard University, USA, (Relation: Postdoc PI)
- **Altug Sisman,** email: altug.sisman@physics.uu.se
  Department of Physics & Astronomy, Uppsala University, Sweden, (Relation: MSc and PhD Advisor)
- **Ozgur E. Mustecaplioglu,** email: omustecap@ku.edu.tr
  Department of Physics, Koç University, Turkey, (Relation: PhD Defense Jury Member, Undergraduate Instructor, Postdoc PI)
- **Ronnie Kosloff,** email: ronnie@fh.huji.ac.il
  Institute of Chemistry, Hebrew University of Jerusalem, Israel, (Relation: Host Supervisor)
- **Jonas Fransson,** email: jonas.fransson@physics.uu.se
  Department of Physics & Astronomy, Uppsala University, Sweden, (Relation: Host Supervisor)
- **Tekin Dereli,** email: tdereli@ku.edu.tr
  Department of Physics, Koç University, Turkey, (Relation: MSc Defense Jury Member, Undergraduate Advisor)