Alexandros Tsouros

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Education

University of Crete, Heraklion, Crete, Greece
Ph.D., Astrophysics, August 2024 (expected)

Bachelor of Science, Physics, June 2019 (Valedictorian) GPA: 9.2/10
Ranked among top 0.1% *of Department's history*

University of Oxford, Oxford, UK
Master of Science, Mathematical and Theoretical Physics, June 2020 Merit

Publications

A. Tsouros, N. D. Kylafis
"The energy distribution of electrons in radio jets"
Astronomy & Astrophysics, **Volume** 603, July 2017
arXiv: 1706.05227

E. Kiritsis, **A. Tsouros**
"de Sitter vs Anti-de Sitter flows and the (super)gravity landscape"
J. High Energ. Phys., **Volume** 126, 2023
arXiv: 1901.04546

V. Pelgrims, G. V. Panopoulou, K. Tassis, V. Pavlidou, A. Basyrov, D. Blinov, E. Gjerløw, S. Kiehlmann, N. Mandarakas, A. Papadaki, R. Skalidis, **A. Tsouros**, R. M. Anche, H. K. Eriksen, T. Ghosh, J. A. Kypriotakis, S. Maharana, E. Ntormousi, T. J. Pearson, S. B. Potter, A. N. Ramaprakash, A. C. S. Readhead and I. K. Wehus
"Starlight-polarization-based tomography of the magnetized ISM: PASIPHAE's line-of-sight inversion method"
Astronomy & Astrophysics, **Volume** 670, February 2023
arXiv: 2208.02278

N. D. Kylafis, P. Reig, **A. Tsouros**
"A quantitative explanation of the radio–X-ray correlation in black-hole X-ray binaries"
Astronomy & Astrophysics, **Volume** 679, November 2023
arXiv: 2309.00316

A. Tsouros, G. Edenhofer, T. Enßlin, M. Mastorakis, V. Pavlidou
"Reconstructing Galactic magnetic fields from local measurements for backtracking ultra-high-energy cosmic rays"
Astronomy & Astrophysics, **Volume** 681, January 2024
arXiv: 2303.10099

A. Tsouros, A. B. Bendre, G. Edenhofer, T. Enßlin, P. Frank, M. Mastorakis, V. Pavlidou
"Non-parametric Bayesian reconstruction of Galactic magnetic fields using Information Field Theory: The inclusion of line-of-sight information in ultra-high energy cosmic ray backtracking"
Submitted to *Astronomy & Astrophysics*,
arXiv: 2403.05531

Honors & Awards

Onassis Foundation funded my participation in the 69th Lindau Nobel Laureate Meeting, amounting to a total sum of 3440 €.

Hellenic Foundation for Research & Innovation PhD Fellowship, ranked 1st out of 227 applications nationwide in the natural sciences (total amount funded: 29700 €)

Conferences & Workshops

13th Hellenic Astronomical Conference, Heraklion	July '17
47th Young Radio Astronomers Conference, Bologna	September '17
69th Lindau Nobel Laureate Meeting, Lindau	August '19
15th Hellenic Astronomical Conference, Held online	July '21
IMAGINE workshop, Stockholm	April '23
From the Galaxy to the Big Bang, Banyuls-sur-Mer, France	June '23

Peer Review

Referee for the Journal of Cosmology and Astroparticle Physics (JCAP).

Research Visits

Max-Planck Institute for Astrophysics Garching, Munich, Germany
Host: Information Field Theory Group (PI: Torsten Enßlin)

California Institute of Technology Pasadena, CA, USA
Host: Phil Hopkins group
Visit funded by RISE AstroStat-II

Kavli Institute for Astroparticle Physics & Cosmology Stanford, CA, USA
Host: Cosmic Magnetism and Interstellar Physics Group (PI: Susan E. Clark)

Kavli Institute for the Physics & Mathematics of the Universe Chiba, Japan
Host: Alexander Kusenko

Programming skills

Programming languages: Python (Expertise), Wolfram Mathematica (Proficient), SQL (Proficient), C (Basic), Fortran (Basic)
Frameworks: NIFTy, TensorFlow, PyTorch
Operating Systems: UNIX

Data skills

Statistics: Highly experienced in Bayesian statistics and high dimensional inference problems. Expertise in the use of relevant software frameworks.
Machine Learning: Experience working with Deep Neural Networks, especially in unsupervised tasks (i.e. generative models, dimensionality reduction).
Data management: Skilled in handling large databases via SQL.

Research interests

My main interest lies in the application and development of innovative statistical methodologies to advanced astronomical data analysis. Eager to leverage these techniques to derive scientific insights. Highly keen on contributing to large-scale collaborative research efforts.

Teaching Assistance

Introduction to Modern Physics 2 Taught by: T. Tomaras
Spring '18, '19

Sophomore level course. Introduces Special Relativity, Nuclear Physics and Elementary Particle Physics, using basic knowledge of Calculus, Classical Physics and Quantum Mechanics.

From Quarks to the Universe Taught by: E. Economou
Winter '20, '21

Senior level course that condenses three years of undergraduate physics at a high-school math level.

Classical Electrodynamics Taught by: K. Tassis
Winter '21, '22

Graduate level course on electrodynamics.

Outreach

I regularly give outreach talks during open days at the Skinakas observatory.

Languages

Greek (Native), English (Fluent), French (B2 Level)