

## Lorenzo Leone

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CONTACT INFORMATION	Corso Vittorio Emanuele 539, Napoli 80135, Italy <i>Tel:</i> (Italy) +39 3888788726, (USA) +1 857 334 2821 <i>Email:</i> <a href="mailto:lorenzo.leone001@umb.edu">lorenzo.leone001@umb.edu</a> <i>Homepage:</i> <a href="#">Lorenzo Leone's personal webpage</a>
CITIZENSHIP	Italy
WHO AM I	I am a Ph.D. student whose main interest is Quantum Information Theory, a broad field able to touch many topics in quantum physics. My research activity involves topics such as Quantum Chaos and quantum complexity. One of my main interests is understanding the different features of Quantum Chaos and the development of a complete characterization of quantum complexity.
RESEARCH INTERESTS	Topics of research I have been particularly interested in are the theory of quantum chaos and quantum complexity, magic of quantum states, theory of entanglement, quantum information in open systems, theory of topological order, theory of quantum integrability, quantum resource theory and coherence in quantum evolutions.
EDUCATION	<b>Umass Boston</b>  Ph.D., Applied Physics, Ongoing (Expected graduation date: May 2023) <ul style="list-style-type: none"><li>• Written Qualifiers: <i>Passed</i></li><li>• Oral Qualifier: <i>Passed</i></li></ul> <b>University of Napoli Federico II</b> , Naples, Italy  M.S., Theoretical Physics, July 2019 <ul style="list-style-type: none"><li>• Thesis Title: <i>Sinergy between the Heat kernel and the parity anomaly</i></li><li>• Advisors: Professor Fedele Lizzi Professor Maxim Kurkov</li><li>• Final Mark: 110/110 cum laude</li></ul>
TEACHING EXPERIENCE	<b>Fall 2019 - Fall 2020</b> Teaching Assistantship, <b>Umass Boston</b>  <b>February 2015 - May 2018</b> Math and Physics tutor for high school and bachelor students.
REFERENCES AVAILABLE TO CONTACT	<b>Alioscia Hama, Ph.D.</b> (e-mail: <a href="mailto:alioscia.hamma@unina.it">alioscia.hamma@unina.it</a> ; Phone: +39 081-676495) <ul style="list-style-type: none"><li>• Professor, <b>Department of Physics</b> <b>University of Naples Federico II</b></li><li>◊ 2N34, Complesso Universitario di Monte Sant'Angelo Complesso universitario di Monte Sant'Angelo - Via Cinthia - 80126 - Naples</li><li>★ <i>Dr. Hama is my Ph.D. advisor.</i></li></ul> <b>Seth Lloyd, Ph.D.</b> (e-mail: <a href="mailto:slloyd@mit.edu">slloyd@mit.edu</a> ; Phone: +1 (617) 252 - 1803) <ul style="list-style-type: none"><li>• Professor, <b>Department of Mechanical Engineering</b> <b>Massachusetts Institute of Technology</b></li><li>◊ 3-160, MIT 77 Massachusetts Avenue, Cambridge, Massachusetts 02139</li></ul> <b>Marco Cerezo, Ph.D.</b> (e-mail: <a href="mailto:cerezo@lanl.gov">cerezo@lanl.gov</a> ; <ul style="list-style-type: none"><li>• Staff Scientist, <b>Los Alamos National Laboratories</b></li><li>◊ Los Alamos National Laboratory, Los Alamos, NM 87545</li></ul>

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- Professor, Department of Physics  
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#### AWARDS

2022 - Quantum Computing Summer School Fellowship - LANL

#### SCHOLARSHIPS

- *Fall 2021* - College of Science and Mathematics Dean's Doctoral Research Fellowship through fellowship
- *Spring 2022* - College of Science and Mathematics Dean's Doctoral Research Fellowship through fellowship

#### PUBLICATIONS

1. Lorenzo Leone, Salvatore F.E. Oliviero, Alioscia Hamma  
*Stabilizer Rényi entropy*  
[Physical Review Letters 128, 050402\(2022\)](#)
2. Salvatore F.E. Oliviero, Lorenzo Leone, You Zhou, Alioscia Hamma  
*Stability of topological purity under random local unitaries*  
[SciPost Phys. 12, 096 \(2022\)](#)
3. Salvatore F.E. Oliviero, Lorenzo Leone, Alioscia Hamma  
*Transitions in entanglement complexity in random quantum circuits by measurements*  
[Physics Letters A, 127721\(2021\)](#)
4. Lorenzo Leone, Salvatore F.E. Oliviero, You Zhou, Alioscia Hamma  
*Quantum Chaos is Quantum*  
[Quantum, volume 5, page 453 \(2021\)](#)
5. Salvatore F.E. Oliviero, Lorenzo Leone, Francesco Caravelli, Alioscia Hamma  
*Random Matrix Theory of the Isospectral Twirling*  
[SciPost Phys. 10, 076 \(2021\)](#)
6. Lorenzo Leone, Salvatore F.E. Oliviero, Alioscia Hamma  
*Isospectral twirling and quantum chaos*  
[Entropy 2021, 23\(8\), 1073\(2021\)](#)
7. Max Kurkov, Lorenzo Leone  
*Remark on the synergy between the heat kernel techniques and the parity anomaly*  
[International Journal of Geometric Methods in Modern Physics, 17, 2050002-679\(2020\)](#)

#### PREPRINTS

8. Lorenzo Leone, Salvatore F.E. Oliviero, Stefano Piemontese, Sarah True, Alioscia Hamma  
*To learn a mocking black hole*  
<https://doi.org/10.48550/arXiv.2206.06385>

9. Salvatore F.E. Oliviero, Lorenzo Leone, Alioscia Hamma  
*Magic of the ground state of the transverse field Ising model*  
<https://doi.org/10.48550/arXiv.2205.02247>
10. Lorenzo Leone, Salvatore F.E. Oliviero, Alioscia Hamma  
*Magic hinders quantum certification*  
<https://doi.org/10.48550/arXiv.2204.02995>
11. Salvatore F.E. Oliviero, Lorenzo Leone, Alioscia Hamma, Seth Lloyd  
*Measuring magic on a quantum processor*  
<https://doi.org/10.48550/arXiv.2204.00015>

#### WORKS IN PREPARATION

1. Salvatore F.E. Oliviero, Lorenzo Leone, Alioscia Hamma  
*Efficient Clifford-decoding quantum information scrambled by  $\mathcal{O}(n)$   $T$  gates*
2. Lorenzo Leone, Salvatore F.E. Oliviero, Lukasz Cincio, Marco Cerezo  
*On the practical usefulness of the Hardware Efficient Ansatz*

#### ORAL AND POSTER PRESENTATIONS

- “Stabilizer Rényi entropy”, APS March Meeting, 17 March 2022, Oral Presentation
- “Emergence of Gibbs distribution in quasi-adiabatic regime”, CNLS Los Alamos, Oral Presentation

#### PROGRAMMING SKILLS

Mathematica, Matlab, Python, C, C++, LaTeX

#### OTHER INTERESTS

Swimming, Running, Music.