

Prof. Emanuele G. Dalla Torre



Born in Milan, Italy on September 19, 1980

Citizenship: Italy, Israel (ID number: 321643868)

Mobile: +972-50-7474535

E-mail: Emanuele.dalla-torre@biu.ac.il

Website: <http://www.nonequilibrium.org>

Affiliation: Department of Physics, Bar-Ilan University, Israel

Short CV:

2022-Now	QuanyMize Ltd	Co-Founder and Chief Scientist
2021-2022	Rigetti Computing	Visiting Scientist (Sabbatical)
2019-Now	Bar-Ilan University	Associate Professor
2014-2019	Bar-Ilan University	Senior Lecturer
2011-2014	Harvard University	Post-Doctorate
2004-2011	Weizmann Institute of Science	Ph.D. in Physics
2000-2004	Technion	B. A. in Physics and Electronic Engineering

Publications: authored 50 peer-reviewed papers, including 8 Phys. Rev. Lett. and 2 Nature Phys.

Funding: won 5 competitive grants awarded by the Israel Science Foundation

Supervision: supervised 7 M. Sc. students, 3 Ph. D. students, and 6 postdoc fellows

Membership: funding member of the center for Quantum entanglement Science and Technology (QUEST) at Bar-Ilan University

Selected publications

- [1] Emanuele G Dalla Torre, Erez Berg, Ehud Altman, *Hidden order in one dimensional Bose insulators*, [Physical Review Letters, 97, 260401 \(2006\)](#)
- [2] EGDT, Yang He, Eugene Demler, *Holographic Maps of Quasiparticle Interference*, [Nature Physics 12, 1052 \(2016\)](#)
- [3] Leon Bello, Marcello Calvanese Strinati, EGDT, Avi Pe'er, *Persistent coherent beating in coupled parametric oscillators*, [Physical Review Letters 123, 083901 \(2019\)](#)
- [4] Daniel Azses, Refael Haenel, Yehuda Naveh, Robert Raussendorf, Eran Sela, EGDT, *Identification of symmetry-protected topological states on noisy quantum computers* [Physical Review Letters 125, 120502 \(2020\)](#)
- [5] Emanuele G. Dalla Torre and Matthew J. Reagor, *Simulating long-range coherence of atoms and photons in quantum computers*, [Physical Review Letters 130, 060403 \(2023\)](#)

Major scientific achievements:

My research topic is the dynamics of many-body quantum systems. During my graduate studies, I focused on the theoretical description of cold atomics gases: we proposed the realization of a new topological phase of bosons (the Haldane insulator) and a new type of nonequilibrium universality, where quantum fluctuations and classical noise blend on equal footing. During my post-doctorate fellowship, I entered the field of quantum optics, and I studied the universal properties of the Dicke model with trapped atoms. At the same time, I worked on high-temperature superconductors, by highlighting the importance of electronic standing waves in the interpretation of modern X-ray scattering experiments [1]. Since 2014, I lead a research group that extends these ideas in new directions and, specifically, in trying to understand the complex behavior of superconducting circuits [2] and qubits, in the presence of noise. My group collaborates with IBM, Rigetti, Amazon, and Microsoft, who gave us access to their quantum computers on the cloud, for free, so that we can test our algorithms on real devices. In two recent publications we used these computers to simulate interesting many-body quantum effects. For example, we used these devices to simulate topological quantum states [4] and quantum phases of matter [5].