PROF. RON FOLMAN (2020)

Personal Information

Address:	Department of Physics
	Ben-Gurion University of the Negev
	84105 Beer Sheva, Israel
E-mail:	<u>folman@bgu.ac.il</u>
Phone:	+972-8-6479263
Fax:	+972-8-6479264
Date and	16 February 1963
Place of birth:	Tel Aviv, Israel

Link to Lab: www.bgu.ac.il/atomchip

Main Research Fields



Quantum Optics, Atom Chips, Interferometry, Magnetometry, Nano fabrication, Photonics, Spectroscopy, Particle physics, Searches for new physics, Quantum technology.

Scientific Career and International Experience

2003 - present	Ben-Gurion University of the Negev, Israel (Full professor since July 2018)
2000 - 2003	Researcher at the University of Heidelberg (Marie Curie fellow), Germany
1999 - 2000	Post-Doc, Innsbruck, Austria
1993 - 1998	Higgs searches at CERN – PhD (home institute: Weizmann)
1989 - 1992	Quark Gluon Plasma (High Energy Physics M.Sc. at Weizmann)
1983 - 1988	Undergraduate, self-taught (open university) – graduated with excellence

Scholarships, Awards, and Honours

2013:	Miller institute for fundamental science - visiting professor award (Berkeley)
2011:	Lamb Medal for quantum optics (<u>http://www.lambmedal.org/</u>) for applying
	the field of material science to quantum optics
2003:	Award by the Israeli center for Science of Complex Systems
2000:	Marie-Curie Fellow

*Our group students have received numerous national and international awards, not listed here.

Positions and Service

- Founder and first director of the BGU nano fabrication facility, conducting R&D for, and supplying chips to, labs in Israel and abroad (e.g. recently to the UK, Germany and the US)
- Founder and first director of the BGU center for quantum science and technology.
- Committee member for conferences and foundations (e.g. GIF, ISF).
- Reviewer for the EC, journals, universities and foundations.
- Editor of book on quantum information.
- Member of the BGU Physics recruiting and promoting faculty committee (Minuyim)

Grants and Funding for the last 5 years

- Israeli Science Foundation (Regular and Quantum Technology grants)
- EC "Matter-Waves" consortium
- EC "Quantum Technology" consortium (COST)
- EC "Optical Clocks" consortium
- DIP (DFG) Quantum hybrid devices (PI)
- Technology (e.g. US Air Force, US Navy, Israeli AeroSpace Industries, Accubeat atomic clocks Ltd.)

Science projects in the last 5 years

- Searching for Dark Matter (built the first DM detector in Israel)
- Searching for new physics at CERN with anti-hydrogen atoms, e.g. on gravity
- Searching for new physics with a newly built Yb optical frequency atomic clock
- Experiments on the interface of Quantum Mechanics and General Relativity
- Experiments with novel atom interferometers, for new insight into the foundations of Quantum theory
- Experiments on fundamental topics of quantum mechanics such as spin, entanglement and decoherence.

Technology projects in the last 5 years

- Compact cold atom clock (delivered to the industry)
- Compact atomic magnetic sensor (delivered to the industry)
- Advanced atom chips for quantum technology
- Atomic acceleration sensors
- Constructing the Israeli time keeping center

Recent lectures in conferences and seminars

PIERS2015 (July, Prague) – invited key note. (Dr. Mark Keil eventually replaced me) 2015 seminars in Innsbruck, Shanghai and Beijing. PQE-2016 - invited. Obergurgl 2016 (February) – hot topics session. Israeli-Italy workshop (April 2016, BIU) – invited. (Yonathan Japha replaced me) VI International Conference "Frontiers of Nonlinear Physics" (July 2016, Russia) – invited. 2016 seminars in Vienna, Southampton, Nottingham and SFB colloquium in ULM. FRISNO-2017, Ein Gedi, Israel. Conference of atomtronics (http://benasque.org/2017atomtronics/) (May2017, Spain) - invited. Unconference (12 persons) in Oxford on time (June 2017) - invited. Conference in Crete on Quantum optics (August 2017) - invited. Workshop in Aspen on Dark Matter (Sep. 2017) – invited (no talk – just discussions) Conference in Armenia on Quantum optics (September 2017) - invited. Israeli Physics Society (December 2017) – invited, opening talk of the cold atom session. 2017 seminars in Jerusalem, Bar-Ilan, NIST, Rutgers PQE-2018 (Utah, January 2018) – 2 invited talks (one on atomtronics given by me, and one on clock interferometry – given by my student Yair Margalit). Conference on Fluctuation-Induced Phenomena (Bad-Honnef, May 2018) - invited. Quantum technology (international workshop in Jerusalem, June 2018) – invited. MPLP 2018 (Novosibirsk, August 2018) - invited. 2018 seminars in Innsbruck, Weizmann, and RQC colloquium in Moscow Time and fundamentals of quantum mechanics (Weizmann, January 2019) – invited. Optical, Opto-Atomic and Entanglement-Enhanced Precision Metrology XII. SPIE Photonics West (OPTO), San Francisco, CA during Feb 2 - Feb 7, 2019 – invited. Atomtronics, (Benasque, May 2019) – invited. Foundations of Physics (Oxford, May 2019) - invited. Frontiers of Nonlinear Physics, FNP-2019 (Russia, June 2019) - invited. Stern-Gerlach 100 Year Fest (Frankfurt, September 2019) – invited. Redefining the foundations of physics in the quantum technology era (Trieste, September 2019), http://www.tequantum.eu/ – invited. 2019 seminars in CERN and Fritz-Haber Institute Berlin.

PQE-2020, Snowbird, US (January 2020) - invited.

Selected Publications

- Z. Zhou, Y. Margalit, S. Moukouri, Y. Meir, and R. Folman, "An experimental test of the geodesic rule proposition for the non-cyclic geometric phase", *Science Advances*, in print (2020).
- O. Amit, Y. Margalit, O. Dobkowski, Z. Zhou, Y. Japha, M. Zimmermann, M. A. Efremov, F. A. Narducci, E. M. Rasel, W. P. Schleich, and R. Folman, "T³ Stern-Gerlach matter-wave interferometer", *Phys. Rev. Lett.* **123**, 083601 (2019).
- Z. Zhou, Y. Margalit, D. Rohrlich, Y. Japha, and R. Folman, "Quantum complementarity of clocks in the context of general relativity", *Classical and Quantum Gravity* **35**, 185003 (2018).
- F. Cerisola, Y. Margalit, S. Machluf, A. J. Roncaglia, J. P. Paz, and R. Folman, "Using a quantum work meter to test nonequilibrium fluctuation theorems", *Nature Communication* **8**, 1241 (2017).
- Y. Margalit, Z. Zhou, S. Machluf, D. Rohrlich, Y. Japha, and R. Folman, "A self-interfering clock as a 'which path' witness", *Science* **349**, 1025 (2015) (also in Science express).
- S. Machluf, Y. Japha, and R. Folman, "Coherent splitting of matter-waves by an atom chip field gradient beam-splitter", *Nature Communications* **4**, 2424 (2013).
- M. Givon, Y. Margalit, A. Waxman, T. David, D. Groswasser, Y. Japha, and R. Folman, "Magic frequencies in atom-light interaction for precision probing of the density matrix", *Phys. Rev. Lett.* **111**, 053004 (2013) highlighted by PRL editors.
- S. Machluf, J. Coslovsky, P. G. Petrov, Y. Japha, and R. Folman, "Coupling between internal spin dynamics and external degrees of freedom in the presence of colored noise", *Phys. Rev. Lett.* **105**, 203002 (2010).
- R. Salem, Y. Japha, J. Chabé, B. Hadad, M. Keil, K. A. Milton, and R. Folman, "Nanowire atom chip traps for sub-micron atom-surface distances", *New J. Phys.* **12**, 023039 (2010).
- S. Aigner, L. Della Pietra, Y. Japha, O. Entin-Wohlman, T. David, R. Salem, R. Folman, and J. Schmiedmayer, "Long-Range Order in Electronic Transport through Disordered Metal Films", *Science* 319, 1226 (2008).
- Y. Japha, O. Arzouan, Y. Avishai, and R. Folman, "Using time-reversal symmetry for sensitive incoherent matter-wave Sagnac interferometry", *Phys. Rev. Lett.* **99**, 060402 (2007).
- D. Rohrlich, Y. Neiman, Y. Japha, and R. Folman, "Interference Swapping in Scattering from a Nonlocal Quantum Target", *Phys. Rev. Lett.* **96**, 173601 (2006).
- R. Folman, P. Krüger, D. Cassettari, B. Hessmo, T. Maier, and J. Schmiedmayer, "Controlling cold atoms using nanofabricated surfaces: Atom Chips", *Phys. Rev. Lett.* **84**, 4749 (2000).

A total of 257 papers.

A list of recent publications at <u>http://www.bgu.ac.il/atomchip/Papers/Papers.htm</u> ORCID: <u>https://orcid.org/0000-0002-3449-2563</u>

Special issue edited by R. Folman



See also our review: M. Keil, O. Amit, S. Zhou, D. Groswasser, Y. Japha, and R. Folman, "Fifteen years of cold matter on the atom chip: Promise, realizations and prospects," *J. Modern Optics* **63**, 1840-1885 (2016).