QIP research activity at the Technion

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Abstract

Quantum information processing (QIP) is a rapidly evolving field, which holds a promise for greatly improved, or fundamentally new kinds of computation, communication and cryptography, based on the rules of quantum physics.

This document describes the activity of the faculty members in the Technion’s Qubit Group (TQG), in the QIP field, namely in the broad field of quantum computing science and engineering. The document summarizes the activity, as of January, 2014. We thank Dr. Yossi Weinstein for his assistance.

At the Technion, there has also been a lot of activity in related fields such as quantum technologies, nano technologies, optics, computer engineering, and theory of computing and cryptography; we shall keep the focus here on QIP solely.

The faculty members in the list are divided into five categories (alphabetically listed in each category) according to their level of activity in QIP:

1. Main Activity
2. Emeritus faculty
3. Partially Relevant Activity
4. Past Activity
5. Potentially Relevant Activity

There is also another category – In Memoriam (Section 6).

For each faculty member a limited list of publications is given. The provided publications are mostly recent (since 2007) and are directly relevant to quantum information and computing. In addition, up to 4 “less relevant” papers are listed as “side issues”, and up to 3 older papers of high relevance were sometimes added. The overall number of publications per faculty member is limited (e.g., to 8–9 in the first category) in order to keep the list short, relevant and convenient. Collaborations are mentioned when they involve a researcher belonging to the first category.

Relevant research fields are listed, according to the following (abbreviated) categories: Quantum Computing (Q-Comp), Quantum Information (Q-Inf), Quantum Cryptography (Q-Crypt), Implementations of Q-Comp/Q-Inf/Q-Crypt systems (Impl), and Quantum Foundations (Q-Found).
1 Main Activity

- **Joseph (Yosi) Avron** ; Physics (Q-Inf, Impl)
  Homepage: [http://phsites.technion.ac.il/avron/](http://phsites.technion.ac.il/avron/)
  Main papers: [12–14], [7,11,88] (with NL and DG).
  Side issues (with DG): [100].
  Old papers: [6] (with NL and DG).

- **Aharon Blank** ; Chemistry (Q-Comp, Impl)
  Homepage: [http://mr-lab.technion.ac.il](http://mr-lab.technion.ac.il)
  Main papers: [33,34,124].
  Side issues: [35,127,128].

- **David Gershoni** ; Physics (Q-Inf, Impl)
  Homepage: [http://physics.technion.ac.il/%7edg/](http://physics.technion.ac.il/%7edg/)
  Main papers: [58,80], [101] (with NL), [7,11,88] (with NL and JA).
  Side issues: [28,101]
  Old papers: [6].

- **Alex Hayat** ; Electrical Engineering (Q-Inf, Q-Crypt, Impl)
  Homepage: [https://sites.google.com/site/alexhayat](https://sites.google.com/site/alexhayat)
  Main papers: [65,67,132], [61–63] (with MO).
  Side issues (with MO): [64,94].

- **Netanel Lindner** ; Physics (Q-Inf, Q-Comp, Impl)
  Main papers: [83,90,122], [101] (with DG), [11,88] (with DG and JA).
  Side issues: [54,84].
  Old papers: [6].

- **Tal Mor** ; Computer Science (Q-Inf, Q-Comp, Q-Crypt, Impl, Q-Found)
  Homepage: [http://www.cs.technion.ac.il/%7etalmo/](http://www.cs.technion.ac.il/%7etalmo/)
  Main papers: [10,37,38,51,57].
  Side issues: [50].
  Old papers: [27,39,40].

- **Meir Orenstein** ; Electrical Engineering (Q-Crypt, Impl)
  Homepage: [http://webee.technion.ac.il/people/meiro/](http://webee.technion.ac.il/people/meiro/)
  Main papers: [66], [126], [61–63,108] (with AH)
  Side issues (with AH): [64].
2 Emeriti Faculty

- Yacob Ben-Aryeh ; Physics (Q-Inf, Q-Comp)
  Homepage: http://phys.technion.ac.il/en/people/faculty-emeriti?view=person&id=37
  Main papers: [17,18,21–25].
  Side issues: [60].

- Rafi Kalish ; Physics (Impl)
  Homepage: http://phys.technion.ac.il/en/people?view=person&id=34
  Main papers: [19,20].
  Side issues: [76,77,92].

- Ady Mann ; Physics (Q-Inf, Q-Comp, Q-Found)
  Homepage: http://phys.technion.ac.il/en/people?view=person&id=28
  Main papers: [73–75,102].
  Side issues: [87,117].
  Old papers: [41,42].

- Micha Revzen ; Physics (Q-Inf, Q-Comp, Q-Found)
  Main papers: [71–74,105–107].
  Old papers: [42].

3 Partially Relevant Activity

- Eric Akkermans ; Physics
  Homepage: http://physics.technion.ac.il/%7eeric/index.php
  Main papers: [2,125].
  Side issues: [3–5].
  Old papers: [91].

- Eyal Buks ; Electrical Engineering (Impl)
  Homepage: http://buks.net.technion.ac.il/
  Main papers: [111].
  Side issues: [15,16,52,123].

- Yonina Eldar ; Electrical Engineering (Q-Inf)
  Homepage: http://webee.technion.ac.il/people/YoninaEldar/index.php
  Main papers: [53,96].
Side issues: [113, 114].  
Old papers: [48, 49].

- Eldar Fischer ; Computer Science (Q-Comp)  
  Homepage: http://www.cs.technion.ac.il/%7eeldar/  
  Main papers: [45, 46].

- Elad Hazan ; Industrial Engineering and Management (Q-Inf)  
  Homepage: http://ie.technion.ac.il/%7eehazan/index.htm  
  Main papers: [68].  
  Side issues: [9, 69].

- Moshe Nazarathy ; Electrical Engineering  
  Homepage: NOT AVAILABLE  
  Main papers (with MO): [126].  
  Old papers: [93].

- Uri Peskin ; Chemistry (Q-Inf)  
  Homepage: http://schulich.technion.ac.il/he/Uri_Peskin.htm  
  Main papers: [95, 99].

- Mordechai (Moti) Segev, Israel Prize Laureate and Distinguished Prof. ; Physics  
  Homepage: http://phys.technion.ac.il/en/people?view=person&id=57  
  Main papers: [96] (with YE).  
  Side issues: [110, 112, 114], [104] (with YE).

4 Past Activity

- Zohar Amitay ; Chemistry (Q-Comp, Impl)  
  Side issues: [47].  
  Old papers: [8, 121, 129].

- Eli Biham ; Computer Science (Q-Comp, Q-Crypt)  
  Side issues: [32].  
  Old papers: [30, 31] (with TM), [29].

- Johann (Janos) Makowsky ; Computer Science  
  Old papers: [1].

- Nader Bshouty ; Computer Science  
  Old papers: [43, 44].
5 Potentially Relevant Activity

- Assa Auerbach; Physics
  Side issues: [81, 82].

- Yoram Baram; Computer Science
  Main papers: [109].

- Alfred (Freddy) Bruckstein; Computer Science

- Yoav Etsion; Computer Science

- Baruch Fischer; Electrical Engineering
  Side issues: [55, 56, 130, 131].

- Shmuel Fishman; Physics

- Haggai Gilboa; Chemistry
  Side issues: [50].

- Dorit Goldsher; Medicine

- Erez Hasman; Mechanical Engineering
  Side issues: [59, 115, 116].

- Alon Hoffman; Chemistry
  Side issues: [78, 118–120].

- Itamar Kahn; Medicine
  Side issues: [70].

- Nimrod Moiseyev; Chemistry
  Side issues: [89].
  Old papers: [79].

- Amos Nevo; Mathematics

- Asher Schmidt; Chemistry
  Side issues: [133].

- Amir Yehudayoff; Mathematics
  Side issues: [36, 103, 134].
In Memoriam

- Asher Peres (1934-2005), a Founder of the QIP field, Distinguished Prof. ; Physics
  (Q-Inf, Q-Comp, Q-Crypt, Q-Found)
  Old papers: [26, 97, 98].

References

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