W. M. Keck Foundation Center for Extreme Quantum Information Theory (xQIT) at the Massachusetts Institute of Technology

2011 xQIT Conference

Difficult Problems in Quantum Information Theory

Program

Tuesday, May 3, 2011

- Breakfast and coffee breaks will be in the fourth-floor lobby of Building 36.
- Lunch will be in the Star Conference Room 32-D463.
- The conference dinner R&D space on the fourth floor of the Stata Center, Building 32.
- All presentations and welcoming remarks will take place in the RLE Conference Center 36-428.

7:30 - 8:30AM
CONTINENTAL BREAKFAST
Building 36 fourth-floor lobby

8:30 - 8:45 AM
Jeffrey Shapiro and Seth Lloyd, MIT
Welcoming remarks

Session I

8:45 - 9:10 AM
Christopher Fuchs, Perimeter Institute for Theoretical Physics
Charting the Shape of Quantum State Space

9:15 - 9:40 AM
G. Mauro D'Ariano, University of Pavia
A Quantum Digital Universe

9:45 - 10:10 AM
Daniel Lidar, University of Southern California
An Extreme Quantum Result

10:15 - 10:45 AM
COFFEE BREAK
Building 36 fourth-floor lobby
### Session II

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:45 - 11:10 AM</td>
<td>Edward Farhi, MIT</td>
<td>An Update on the Quantum Adiabatic Algorithm</td>
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<tr>
<td>11:15 - 11:40 AM</td>
<td>Scott Aaronson, MIT</td>
<td>The Quantum Money Frontier</td>
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<tr>
<td>11:45 AM - 12:10 PM</td>
<td>Peter Shor, MIT</td>
<td>TBD</td>
</tr>
<tr>
<td>12:15 - 1:45 PM</td>
<td>LUNCH</td>
<td>Star Conference Room, 32-D463</td>
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### Session III

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:45 - 2:10 PM</td>
<td>Seth Lloyd, MIT</td>
<td>Projective Measurements for Quantum Channel Decoding</td>
</tr>
<tr>
<td>2:15 - 2:40 PM</td>
<td>Vittorio Giovannetti, Scuola Normale Superiore</td>
<td>Master Equations for Correlated Quantum Channels</td>
</tr>
<tr>
<td>2:45 - 3:10 PM</td>
<td>Raul Garcia-Patron, Max Planck Institute for Quantum Optics</td>
<td>Majorization Relations in a Two-Mode Squeezer: A Possible Way towards Solving the Minimum Output Entropy Conjecture for Bosonic Gaussian Channels</td>
</tr>
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<td>3:15 - 3:45 PM</td>
<td>COFFEE BREAK</td>
<td>Building 36 fourth-floor lobby</td>
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</tbody>
</table>

### Session IV

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:45 - 4:10 PM</td>
<td>Daniel Gottesman, Perimeter Institute for Theoretical Physics</td>
<td>Improving Telescopes with Quantum Repeaters</td>
</tr>
<tr>
<td>4:15 - 4:40 PM</td>
<td>Mankei Tsang, University of New Mexico</td>
<td>Quantum Limits to Waveform Estimation</td>
</tr>
</tbody>
</table>
4:45 - 5:10 PM  Howard Wiseman, Griffith University
How Many Bits Does it Take to Track an Open Quantum System

6:30 PM  Dinner
Stata Center fourth-floor R&D space

Wednesday, May 4, 2011

- Breakfast and coffee breaks will be in the fourth-floor lobby of Building 36
- Lunch will be in the Student Center, Building W20
- All presentations and closing remarks will take place in the RLE Conference Center 36-428.

7:30 - 8:45 AM  CONTINENTAL BREAKFAST
Building 36 fourth-floor lobby

Session V

8:45 - 9:10 AM  Nicolas Cerf, Université Libre de Bruxelles
Gaussian Quantum Error Correction

9:15 - 9:40 AM  Saikat Guha, Raytheon BBN Technologies
Optical Realizations of Optimal Quantum Receivers

9:45 - 10:10 AM  Mark Wilde, McGill University
The Quest for a Quantum Simultaneous Decoder

10:15 - 10:45 AM  COFFEE BREAK
Building 36 fourth-floor lobby

Session VI

10:45 - 11:10 AM  Lorenzo Maccone, University of Pavia
Quantum Randomness from Locality?

11:15 - 11:40 AM  David Bacon, University of Washington
Graph Isomorphism Beyond the Hidden Subgroup Problem
11:45 AM - 12:10 PM
Paolo Zanardi, University of Southern California
Random Complex Network and Quantum Entanglement

12:15 - 1:45 PM
LUNCH
Student Center, Building W20

Session VII

1:45 - 2:10 PM
Stefano Pirandola, University of York
Binary Quantum Discrimination

2:15 - 2:40 PM
Jeffrey Shapiro, MIT
Defeating Eavesdropping with Gaussian-State Quantum Illumination

2:45 - 3:10 PM
Graeme Smith, IBM
Realistic Zero-Capacity Channels for Quantum Communication

3:15 - 3:45 PM
COFFEE BREAK
Building 36 fourth-floor lobby

Session VIII

3:45 – 4:10 PM
Lorenza Viola, Dartmouth College
Pointer State Engineering

4:15 – 4:40 PM
Paola Cappellaro, MIT
Coherent-State Transfer via Mixed Spin Chains

4:45 – 5:10 PM
Christian Weedbrook, University of Toronto
Quantum Cryptography Approaching the Classical Limit

5:15 – 5:25 PM
Seth Lloyd and Jeffrey Shapiro
Closing Remarks