
THE QUANTUM TIMES

APS TOPICAL GROUP ON QUANTUM INFORMATION, CONCEPTS, AND COMPUTATION

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Science Without Borders: Quantum Information in Iran

This year the first International Iran Conference on Quantum Information (IICQI) – see <http://iicqi.sharif.ir/> – was held at Kish Island in Iran 7-10 September 2007. The conference was sponsored by Sharif University of Technology and its affiliate Kish University, which was the local host of the conference, the Institute for Studies in Theoretical Physics and Mathematics (IPM), Hi-Tech Industries Center, Center for International Collaboration, Kish Free Zone Organization (KFZO) and The Center of Excellence In Complex System and Condensed Matter (CSCM). The high level of support was instrumental in supporting numerous foreign participants (one-quarter of the 98 registrants) and also in keeping the costs down for Iranian participants, and having the conference held at Kish Island meant that people from around the world could come without visas.

The low cost for Iranians was important in making the conference a success. In contrast to typical conferences in most of the world, Iranian faculty members and students do not have much if any grant funding for conferences and travel and therefore paid all or most of their own costs from their own personal money, which meant that a low-cost meeting was essential to encourage a high level of participation. On the plus side, the attendees were extraordinarily committed to learning, discussing, and presenting work far beyond what I am used to at typical conferences: many participants came to talks prepared and knowledgeable about the speaker's work, and the poster session was wonderful with many animated discussions and the overall quality of the poster presentation amongst the best I have ever seen. The conference had a busy schedule, so time to visit the sites of Kish island and to enjoy diving or snorkeling in the coral-edged lagoons surrounding the island was limited, but the busy schedule was permeated by animated discussions about quantum information and potential collaborations.

The invited speakers at the conference comprised Bartlett (Sydney), Cabello (Seville), Coecke (Oxford), Danos (CNRS France), Giovannetti (Pisa), Jafarizadeh (Tabriz), Kashefi (Oxford), Maccone (Pavia), Mancini (Camerino), Markham (Tokyo), Nakahara (Kinki), Plenio (Imperial), Rudolph (Imperial), Steinberg (Toronto), plus me. The invited speakers plus numerous foreign contributors to the conference ensured broad representation from around the world, thus ensuring this conference was genuinely international. The international flavor of the conference was greatly appreciated by the Iranian participants, for whom this conference was a unique opportunity to meet and discuss quantum information with so many leaders in the field. I expect that, as a consequence of this conference, quantum information research activity in Iran will increase, and the quality will continue to rise.

In co-organizing this conference with my colleague Vahid Karimipour of Sharif University of Technology, and his student

(continued on next page)

Inside...

...you'll find statements from the candidates running for various posts within our topical group. I extend my thanks and appreciation to the candidates, who were under a time-crunch, and Charles Bennett and the rest of the Nominating Committee for arranging the slate of candidates and collecting their statements for the newsletter.

This issue also headlines with an article by Barry Sanders concerning his recent involvement in organizing a conference on quantum information in Iran (which also recently played host to the International Physics Olympiad). It is a reminder that regardless of political differences, we are all human. Historically science (and particularly physics) has been used as a way to reach across barriers of all types (political, geographical, etc.). Thus we have included an excerpt from the famous Erice Statement by physicists Paul Dirac, Piotr Kapitza, and Antonino Zichichi. In light of this and the editorial I wrote in the last issue, this statement is worth reading.

*-Ian T. Durham, Editor
Department of Physics
Saint Anselm College*

and exemplary conference organizer Laleh Memarzadeh Esfahani, I had numerous concerns expressed to me by colleagues, especially those few who turned down invitations. The concerns they voiced included the following: risk kidnapping by the authorities, repression of women, terrorism, war with the United States, fear of giving Iranians access to scientific knowhow that could lead to advances in the nuclear program, limited local organizational ability, and low quality of the conference. I will deal with these concerns in a moment but first let me highlight one of the most important achievements of IICQI 2007: the conference was held successfully in Kish, followed by a tour of the mainland involving most of the foreign participants, and everyone was warmly welcomed and treated with the greatest respect, the majority of participants were highly active female students and faculty members, and the precedent of this conference will ensure that future conferences are judged based on what Iran and Iranian science really are, rather than how Iran is portrayed by the media.

Let me respond to the above concerns. To begin, this conference is just one of many academic events that take place in Iran. Iran has a high level of academic achievement, especially in theoretical physics, and excellent conferences to complement these activities. Women and men participated as equals in the conference, including eating together, talking together, and laughing and joking together. Of course women have dress restrictions but so do men: for example, men have to wear clothes that cover the legs to below the knees. As for war, it didn't happen, and we quantum information scientists continue to hope that a war doesn't happen! Politics were distant from the conference. However, one amazing experience for me in Iran was the freedom to discuss politics and religion. Even complete strangers would quickly espouse their feelings about politics, religion, and anything else, to each other and to foreigners. I had expected some censorship of discussion, or at least reluctance, but instead discovered a society that reveled in discussing anything and everything without feeling that such discussions are taboo.

As for concerns about leading information, everything at the conference is either published in open journal or will be. Regardless of the politics between countries, scientific dialogue at this conference was about topics that are completely in the open, and this epitomizes what makes science so great. Just like art, music, and sports, science is a glue that brings people together regardless of the politics that should be relegated to an orthogonal hyperplane. The concern about limited

organizational ability; between IPM, Sharif University of Technology and its affiliate Kish University, and Calgary's Institute for Quantum Information Science (specifically postdoctoral fellow Ali Rezakhani, who dedicated significant time and effort but unfortunately couldn't attend), this conference went very well (aside from some unfortunate delays in baggage transfers in Dubai for Kish-bound flights).

Finally the question about the quality of the conference has been resoundingly answered in a positive way by the excellent science and scientists who participated in this conference. Of course there is room to boost the quality of the conference, and next year a few of us will organize a summer school in Iran for September 2008 to elevate the skills, knowledge, and understanding of quantum information for all interested Iranian faculty and students. Next year's summer school will be especially beneficial in helping smaller universities or universities that do not yet have a strong foundation in quantum information to achieve state-of-the-art knowledge and comprehension.

The conference was followed by a tour of the mainland, specifically a couple of days in Isfahan and a couple of days in Shiraz. Lorenzo Maccone took some beautiful pictures of the conference and the tour afterwards, and his photographs can be viewed at <http://www.quantummechanics.it/macca/iran/photos/index.html>. Unfortunately the pictures aren't labeled, but there are some beautiful shots of Persepolis and the nearby necropolis, Zoroastrian fire temples, and street life. I skipped part of the tour in Shiraz to go to the main Shiraz synagogue for Rosh Hashana (Jewish New Year, which coincided with the start of Ramadan) services. This experience was beyond description as I was apparently the first non-Iranian Jewish person to visit their synagogue in years, and everyone there, it seemed, wanted to talk to me. I had dinner and lunch with a local family, and communicated in English with younger people and in Hebrew with older people. I could write for pages about that experience, but I won't: my point here is simply that Iran is a diverse society with many special peoples, and I had the freedom to wander off, talk to whom I wanted, and have my own personal experiences in Iran. After the conference I was in Tehran for a few days as a guest of IPM and had excellent physics discussions and tours of facilities at IPM, Sharif, and Azad University (Science and Research Section).

Whatever views we may hold about Iranian society and politics, this conference opened up new dialogues and new understanding on both scientific and non-scientific levels. The conference

culminated in nascent scientific ventures, embryonic collaborations, and most importantly new friendships. I am proud to have been able to co-organize a conference that will serve as a foundation for future international quantum information summer schools and conferences located in Iran so that Iranians have ample, affordable opportunities to learn the latest in quantum information, and we foreigners have the opportunity to work with the Iranians and to learn from them as well.

–Barry C. Sanders
Institute for Quantum Information Science
& Department of Physics and Astronomy
University of Calgary

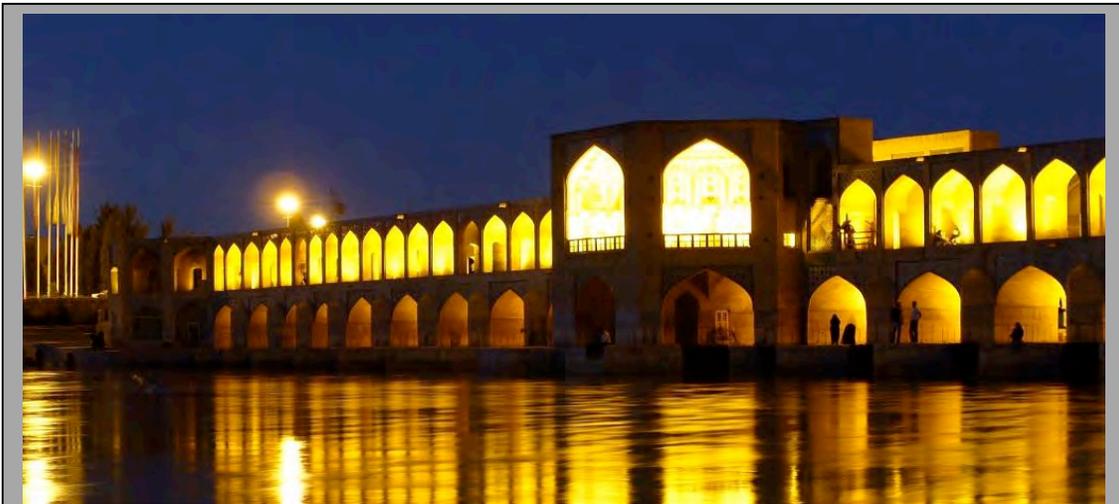
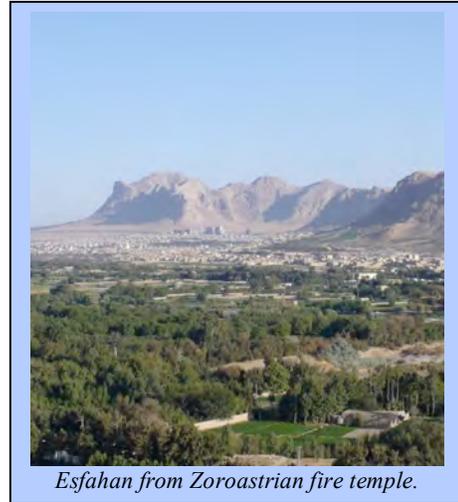
Erice Statement

PROPOSAL TWO

All Governments should make every effort to reduce or eliminate restrictions on the free flow of information, ideas, and people. Such restrictions add to suspicion and animosity in the world.

Excerpted from the Erice Statement, written in August of 1982 in Erice, Italy by Paul Dirac, Piotr Kapitza, and Antonino Zichichi.

The full Erice Statement is available at http://www.ccsem.infn.it/em/erice_statement/



The Lion Bridge, Esfahan. This and the above photos are courtesy Lorenzo Maccone.

See Lorenzo's photos and some by Aephrain Steinberg as well as others at <http://www.quantummechanics.it/-macca/iran/photos/index.html> and <http://utoronto.facebook.com/album.php?%20aid=6306&l=65ed2&id=610328490>

Ninth International Conference on Quantum Communication, Measurement and Computing (QCMC)

UNIVERSITY OF CALGARY, CANADA,
AUGUST 19 TO 24, 2008

The scope of the conference will be similar to that of previous meetings in the series and include the following topics:

*Quantum Cryptography and Quantum
Communications*

*Quantum Measurement and Quantum
Metrology*

*Quantum Computing and Quantum Information
Theory*

*Implementations of
Quantum Information Processing*

Quantum Control

The abstract submission deadline for contributed papers is April 15, 2008, and the early registration deadline is June 30, 2008. Further details about the meeting can be found on the website <http://www.qcmc2008.org/>.

Calgary is a city of one million inhabitants in the foothills of the magnificent Canadian Rocky Mountains. Calgary is close to Banff National Park and offers many summertime recreational activities including hiking, whitewater rafting and kayaking, climbing, caving, mountain-lake scuba diving, mountain biking, glacier trips, hang gliding, and horseback riding. August is an excellent month for recreation due to its element warm and usually dry weather.

We look forward to welcoming you in Calgary in August 2008. On behalf of the organizing and program committees,

*–Alex Lvovsky, Principal Organizer
Institute for Quantum Information Science
& Department of Physics and Astronomy
University of Calgary*

Bits, Bytes, & Qubits QUANTUM NEWS AND NOTES

|0⟩ **Swiss elections and quantum cryptography.**

While the move was criticized by some and questioned by others, Swiss officials employed a quantum cryptographic system developed by Geneva-based id Quantique to provide secure transmission of votes during October's parliamentary elections in the canton of Geneva (there are 26 cantons in Switzerland). The company's Cerberis system, developed in conjunction with Australian firm Senetas, was used for encrypting ballot data transmitted from the central ballot counting station and the government data center. Critics have countered that electronic voting machines are more vulnerable than the transmission process itself. Votes in Swiss elections, however, are counted by hand before being entered into a computer and transmitted to the data center. The demonstration marks the start of the SwissQuantum project managed by Nicolas Gisin as well as the first use of a 1 GHz quantum encrypter operating on a standard fiber optic line.

⟨1|0⟩ **Zeilinger wins first Isaac Newton medal.**

Anton Zeilinger has been honored with the first Isaac Newton Medal, given by the UK's Institute of Physics (IOP), quite simply, for "outstanding contributions to physics" regardless of subject area. As most in the quantum information community know, Zeilinger is Professor of Experimental Physics at the University of Vienna and scientific director of the Institute of Quantum Optics and Quantum Information IQOQI, Austrian Academy of Sciences. He was specifically honored for his "pioneering conceptual and experimental contributions to the foundations of quantum physics, which have become the cornerstone for the rapidly-evolving field of quantum information." Once again, we extend our congratulations to Anton!

⟨1|0⟩ **IOP quantizes Maxwell Medal and Prize.**

Anton Zeilinger wasn't the only quantum mechanic honored by the IOP recently. The Maxwell Medal and prize has been awarded to Sougato Bose of the Department of Physics

and Astronomy at University College, London, for “for his work on the characterisation and exploitation of entanglement in quantum systems.”

⟨1|0⟩ **Nobel Prize in Physics: Giant meets nano.**

This year’s Nobel Prize in Physics has been awarded to Albert Fert of the Université Paris-Sud and Peter Grünberg of the Institut für Festkörperforschung in Jülich, Germany for their discovery of Giant Magnetoresistance (GMR). Don’t think GMR has had any effect on your life? Think again. GMR has been a major force driving the miniaturization of electronic storage devices like that 160 GB iPod in your pocket. GMR is realized by sandwiching layers of magnetic and non-magnetic materials such that the electrons have anti-parallel spin in adjoining layers thus greatly increasing the resistance from layer-to-layer. When the effect was first discovered in 1980s, Fert’s group found a magnetization-dependent change in resistance of 50% while Grünberg’s group found a change of 10%. Traditional methods had never achieved more than roughly a 1% change. While the methods used by both groups was cumbersome and not well-suited for manufacturing purposes, the discovery paved the way for the subsequent development of smaller and smaller components with simultaneously greater and greater capacity. While GMR was not actually applied to the problem of increasing hard disk storage capacity until the 1990s, it took little more than fifteen years to reach the point today where 1 terabyte drives available for home use. Now *that’s* a lot of CDs! The APS GQI extends its congratulations to our colleagues on a job well-done!

⟨1|0⟩ **Quantum Hall effect déjà vu all over again**

Back in 1985 (the year *Back To The Future* was released and everyone in my generation suddenly wanted a DeLorean), the Nobel Prize in Physics was awarded to Klaus von Klitzing of the Universität Würzburg for his discovery of the quantum *charge* Hall effect. Until now, there was no need to include ‘charge’ when discussing this phenomenon since no other quantum Hall effect was known. Recently, however, a group at Würzburg led by Hartmut Buhmann and Lorenz Molenkamp that also included researchers from Stanford University in California, discovered the quantum *spin* Hall effect. The importance of this discovery

lies in the fact that the effect allows for the transport and manipulation of information without a loss of energy. Outside of the rather interesting theoretical implications of this, it could potentially lead to novel ways in which computers can be cooled, something that is presently one of the limitations on further increasing processor speeds. That means that everyone’s laptops could become much cooler in the future which, on this cold November day, is something I’m not sure I’m entirely looking forward to.

⟨1|0⟩ **Quantiki moves to new server after crash.**

After experiencing a severe hardware failure a few months ago, Quantiki, one of two quantum Wikis on the web, has migrated to a new server while also updating its logo. While the new server is excellent news for a site that I personally think has tremendous potential as both a research and teaching resource, the new logo is the more sexy upgrade of the two. As you can tell from this section of *The Times*, I like bra(c)ket notation. If you want to see the new logo, head on over to Quantiki.org!

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APS March Meeting

MARCH 10-14, 2008, NEW ORLEANS, LA

Abstract submission deadline:

November 27, 2007, 5 PM EST

GQI-sponsored & co-sponsored sessions:

Symposia

Quantum Information meets Gravitation

Approaching Quantum Limits in Optomechanical Systems
(with DCMP)

Circuit QED: Superconducting Qubits Coupled to Cavities
(with DCMP)

Quantum Simulation and Quantum Information Theory in
Cold Atoms (with DAMOP)

Focus Sessions

Foundations of Quantum Theory

Quantum Metrology and Control: Fundamental Limits and
Applications

Superconducting Qubits

Progress toward Scalable Quantum Information Processing

Quantum Simulation of Condensed-Matter Systems with
Ultracold Atoms (with DAMOP)

Materials Issues for Quantum Computing & Quantum
Engineering (with DMP)

You can find more information at aps.org.

Elections & Name

INCLUDING CANDIDATE STATEMENTS

The election for the APS Topical Group on Quantum Information, Concepts, and Computation (publishers of this fine piece of reading material) will take place just after the new year. Members will be asked not only to vote on candidates for the various offices within the group, but also to vote on a set of new by-laws. Please note that *if* the new by-laws are approved, the group's name would *automatically change* to the Topical Group on Quantum Information. Please be aware of this.

The candidates are:

Vice-chair

Dave Bacon
Dana Berkeland

Member-at-Large

Immanuel Bloch
Michel Devoret
Chris Monroe
Carl Williams

CANDIDATE STATEMENTS

DAVE BACON

BIOGRAPHY

Dave Bacon received a B.S. in Physics and a B.S. Literature from the California Institute of Technology in 1997 and obtained a Ph.D. in theoretical physics from the University of California, Berkeley in 2001. From 2001 to 2004 he was a postdoctoral scholar at Caltech's Institute for Quantum Information and then from 2004 to 2005 was a postdoctoral scholar at the Santa Fe Institute. In 2005 he joined the Department of Computer Science at University of Washington where he is now a research assistant professor with and adjunct appointment in the Department of Physics. His research has been across a wide swath of theoretical quantum information science research, including the computer science heavy study of quantum algorithms, foundational studies of quantum theory from an information theoretic perspective, and the study of physics inspired methods for quantum error correction. He served as the temporary secretary-treasurer for the GQI prior to its first official year as a topical group and was a member of the GQI fellowship committee in 2007.

STATEMENT

The APS topical group on quantum information, concepts, and computation (GQI) brings together a

group which, while diverse, is united in the belief that the quantum theory of nature is of ever increasing importance in science and technology. Increasingly however (and in large part due to the successes of various subfields of quantum information) the field of all things quantum finds itself more and more fractured. Gone are the days when an experimental physicist working on superconducting qubits was slotted to speak immediately between a theoretical computer scientist discussing the theory of quantum entanglement and a theoretical AMO physicist discussing a new method for enacting two qubit quantum gates. GQI, I believe, can serve an important role by filling the increasing gaps between quantum researchers and bringing them together under a united umbrella. To achieve this GQI must overcome the following challenges which will be the focus of my work for the topical group. First, GQI needs to recruit a larger pool of quantum researchers, including the many researchers who now reside in engineering and computer science departments, as well as those from more traditional physics fields, like condensed matter physics, where quantum information science is becoming increasingly important. Second GQI must organize March meetings talks in which the diversity of high quality quantum research is showcased. Because there is a natural tendency to cluster into specialized groups, a conscious effort must be put into promoting interaction among quantum researchers. Finally, GQI needs to present to the greater APS community that quantum concepts and information is a valid and full fledged subdiscipline of physics. While there is a greater acceptance today that quantum information science is a valid field of physics, communicating the greater successes of quantum researchers, from the prospects of quantum experiments to better control and understand nature, to the theoretical insights of studying quantum theory from a foundational and computational point of view, needs to be loudly and brightly communicated to the broader APS community.

DANA BERKELUND

BIOGRAPHY

Dana Berkeland received her B.A. in Physics in 1988 from the University of California, Berkeley, and her Ph.D. in 1995 from Yale University. Her graduate work involved precisely measuring Stark shifts in lithium and cesium atoms, and precisely measuring the ground state Lamb shift in atomic hydrogen. Dana then went to the National Institute

of Standards and Technology in Boulder, CO as a National Research Council postdoctoral fellow, where she evaluated a trapped mercury ion microwave frequency standard. She next went to Los Alamos National Laboratory as a J. Robert Oppenheimer Fellow, and became a Technical Staff Member in 2000. While at LANL, Dana built an ion trapping laboratory based on strontium ions in a linear Paul trap. The focus of that work was quantum optics, tests of randomness in quantum mechanics, and quantum simulation of condensed matter systems. Dana has served on the Executive Committee for the Topical Group on Precision Measurements and Fundamental Constants, and is currently on the March Meeting Program Committee of GQI. In April 2007, Dana took an Intergovernmental Personal Act (IPA) position at the Intelligence Advanced Research Projects Activity (IARPA) in the Washington DC area. She is presently serving as the Program Manager for the Quantum Information Science Program in that organization.

STATEMENT

The field of quantum information science has rapidly evolved into a robust community of researchers. Activities span an extremely broad range of maturity, from theoretical work on the most fundamental concepts of quantum mechanics, to experimental research in basic qubit technologies, to the commercialization of quantum cryptography. Researchers come from a similarly broad range of backgrounds in traditional physics research, such as solid state, atomic, molecular and optical physics. The Group on Quantum Information has done an excellent job of nurturing this diverse community. I would like GQI to help the quantum community advance the maturity of its activities by increasing the breadth of its membership. While the community has collected its members from traditional physics disciplines, it can now benefit from involving researchers from outside these areas. Some quantum research has reached the point at which it would advance more rapidly by using input from engineers and scientists not otherwise engaged in quantum information research. Their communities may provide solutions to technical problems not readily solved by components currently in use in quantum experiments. New members to the quantum community may analyze experimental systems from a different perspective and stimulate fresh ideas of theoretical interest. Rapid progress towards applications and involvement with other researchers should generate yet wider interest in quantum information that would generally benefit

the entire range of activities represented by GQI. Accordingly, I would like to help GQI foster interactions with potential new contributors to our field, to further establish the significance of quantum information science and technology to both fundamental and applied research.

IMMANUEL BLOCH

BIOGRAPHY

Immanuel Bloch graduated from the University of Bonn in 1996 and received his PhD from the Ludwig-Maximilians University (LMU) in Munich 2000, under Ted Hänsch. From 2000-2003, he was senior researcher and junior group leader at the Max-Planck Institute for Quantum Optics and the LMU Munich. Since 2003 he is professor for experimental physics at the Johannes Gutenberg-University in Mainz (Germany) and has focused his work on quantum information and quantum simulations with ultracold quantum gases in optical lattices. Bloch has received several prizes, among them the Otto-Hahn Medal 2002, the Rudolf Kaiser Prize 2003; the Gottfried-Wilhelm-Leibniz Prize 2005 and the International Commission of Optics (ICO) Prize 2005. Together with David DiVincenzo he is currently organizing the GRC conference on Quantum Information Science 2008.

STATEMENT

As one of the most important goals of the APS QI topical group, I would like to promote cross-disciplinary work and thereby try to avoid a fragmentation of the field, which I see as a real danger. For example, I see a huge potential for such cross-disciplinary work e.g. along the borders of strongly correlated many body quantum systems and their description via quantum information methods and vice versa. I would like to strengthen those links and thereby help to broaden the impact of quantum information science.

MICHEL DEVORET

BIOGRAPHY

Michel H. Devoret, a professor at Yale University since 2002, graduated from "Ecole Nationale Supérieure des Télécommunications" in Paris in 1975 and started graduate work in molecular quantum physics at the University of Orsay. He then joined Prof. Anatole Abragam's laboratory in CEA-Saclay to work on NMR investigation of the quadrupolar glass phase of solid hydrogen, and received his PhD from Paris University in 1982. He spent two post-doctoral years working on quantum mechanical electronics in Prof. John Clarke's

laboratory at the University of California, Berkeley, and, upon his return at Saclay, started his own research group with Daniel Esteve and Cristian Urbina. Among the achievements of this Saclay "quantronics group" are the measurement of the traversal time of tunneling, the invention of the single electron pump (now the basis of a new standard of capacitance), the first observation of the charge of Cooper pairs, and the invention of a highly coherent superconducting qubit, the so-called Quantronium circuit. At Yale, Michel Devoret's group, in collaboration with Rob Schoelkopf's and Steve Girvin's groups, developed a new type of quantum-limited amplifier, the so-called bifurcation amplifier. Besides experiments on the fundamental principles of amplification, Michel Devoret's research focuses on quantum information processing, using mesoscopic superconducting circuits. He is the recipient of the Ampère Prize of the French Academy of Science (1991), the Descartes-Huygens Prize of the Royal Academy of Science of the Netherlands (1996) and the Europhysics Prize (2004). He is a member of the American Academy of Arts and Sciences (2002) and has been appointed to the Chair of Mesoscopic Physics at the "Collège de France" in Paris (2007), where he lectures yearly.

STATEMENT

The QI group within the APS has the important role of bringing together with physicists, researchers from computer science, mathematics, information theory, electrical engineering, and those interested in the foundations of quantum theory. Quantum information borrows from all these different disciplines and, while providing a bridge between them, sheds a new light on the deep meaning and potential applications of quantum principles.

CHRIS MONROE

BIOGRAPHY

Christopher Monroe graduated from MIT in 1987 and received his Ph.D. from the University of Colorado in 1992, under Carl Wieman. From 1992-2000, he was a researcher at NIST, working with David Wineland. >From 2000-2007, he was Professor of Physics at the University of Michigan, and from 2006-2007 he was Director of the FOCUS NSF Physics Frontier Center. In 2007, Monroe moved to the University of Maryland Department of Physics and the Joint Quantum Institute, a joint venture between Univ. Maryland and NIST. Monroe is an experimentalist in the area of atomic, molecular, and optical physics, with

interests in trapped and laser-cooled atoms and ions, interactions between cold atoms and ultrafast optical pulses, entanglement of individual atoms through coherent optical control, and quantum information science. His research group specializes in the confinement and manipulation of individual ions with electromagnetic and laser fields. Monroe is a fellow of the American Physical Society and the Institute of Physics, was the 2001 recipient of the I.I. Rabi Prize in Atomic, Molecular, and Optical Physics, the 2000 International Quantum Communication Award, and the 1997 Presidential Early Career Award.

STATEMENT

The APS Quantum Information topical group brings together corners of various divisions of APS (e.g., DAMOP, DCMP, DLS), and one of its primary roles is to ensure that the breadth of QIS is present at the various divisional meetings. But the APS QI topical group is also home for a more general crowd who are not well represented in the conventional APS units, or who do not even call themselves physicists. Perhaps the most important aspect of the APS QI group is the presence of those in computer science, mathematics, information theory, electrical engineering, and others interested in foundational aspects of quantum theory. Quantum information science is one of those areas where conventional boundaries are not so important, and I feel that the existence of the QI group within APS recognizes this and should actively promote forums, activities, and the funding of QI research outside of traditional academic divisions.

CARL WILLIAMS

BIOGRAPHY

Carl J. Williams is Chief of the Atomic Physics Division, of the National Institute of Standards and Technology (NIST). In addition to his responsibilities as Chief, he coordinates the NIST Quantum Information Program (<http://qubit.nist.gov>) and is co-Director of the newly established Joint Quantum Institute (<http://jq.i.umd.edu>) between NIST and the University of Maryland. His research activities include ultracold atomic collisions, Bose-Einstein condensation, many-body physics, and quantum information science. The primary focus of his work within the quantum information arena is on high-speed quantum cryptography and neutral atom quantum computing – including quantum gates, generalized quantum architectures, and quantum simulations. His focus on many-body physics and

cold atom collisions is now focused on their applications to neutral atom quantum computing. Dr. Williams received his Ph.D. from the University of Chicago in 1987, joined NIST in 1998 becoming coordinator of the NIST Quantum Information Program in 2000, and Chief of the Atomic Physics Division in 2004. He is a Fellow of the American Physical Society, was awarded the Department of Commerce Silver Medal in 2003 for his leadership of the NIST Quantum Information Program, and was awarded the Arthur S. Flemming Award for Scientific Excellence in Government Service for his contributions to quantum physics. He is the author of over 80 technical publications and speaker at numerous national and international conferences.

STATEMENT

It is an honor and pleasure to be nominated for Member-at-Large of GQI. If elected I would work to further the goals of the topical group including its focus on the physics of quantum information, computing, fundamental concepts, and foundations and to represent the broad membership of the GQI. I have become increasingly convinced that quantum information science has the potential of having tremendous scientific and technical impact for the 21st century and have worked at NIST, within the US government, within the broad community, and most recently as part of the Joint Quantum Institute to further this broad view and to encourage additional investment in this emerging area of physics. The GQI provides a forum for furthering these pursuits and for educating the broader scientific community on the potentials of this rapidly progressing and challenging field that is refocusing some of the most important aspects of quantum mechanics. I believe that quantum information science provides new tools and views for understanding complex quantum many body physics and for educating a broader community, including computer scientists, mathematicians, and engineers in the foundations of quantum mechanics.

Mermin publishes new book

N. David Mermin has recently published *Quantum Computer Science* based on lectures given at Cornell University. Have you finished reading it? Would you like to write a review for *The Times*? E-mail me at idurham@anselm.edu.

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THE LIGHTER SIDE

APS ANNOUNCES NANOBOWL AND WORLD'S SMALLEST TROPHY (This is *not* a joke, though it should be fun!)

The APS is sponsoring the first ever NanoBowl. No, it's not a bunch of microscopic football players running around on a microscopic field. But it *is* a challenge: make a video about physics in football (or, according to a source within the APS, rugby as well), post the video to YouTube, and e-mail the organizers. It's as simple as that! The best video will be chosen in January and the winner will receive **the world's smallest trophy** along with **\$1000**. The trophy is a nano-scale football field and helmet (only visible with an electron microscope or something similar) currently being created at Cornell University. Details including some suggested examples can be found at:

<http://www.physicscentral.org/nanobowl>

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GQI Website

<http://units.aps.org/units/gqi/>

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