SPECIAL SECTION

Quantum Information Processing

INTRODUCTION
1163 The Future of Quantum Information Processing

REVIEWS
1164 Scaling the Ion Trap Quantum Processor
C. Monroe and J. Kim
1169 Superconducting Circuits for Quantum Information: An Outlook
M. H. Devoret and R. J. Schoelkopf

LETTERS
1148 The Other Revolution in the Life Sciences
C. De Duve
Museums’ Role: Increasing Knowledge
G. C. Mayer et al.
Museums’ Role: Pollen and Forensic Science
S. Warny

CORRECTIONS AND CLARIFICATIONS
1149

BOOKS ET AL.
1150 The Emergence of Organizations and Markets
J. F. Padgett and W. W. Powell, Eds., reviewed by M. Macy
1151 2052
J. Randers, reviewed by R. E. Horn

POLICY FORUM
1152 Behavioral Economics and the Retirement Savings Crisis
S. Benartzi and R. H. Thaler

PERSPECTIVES
1154 With a Little Help from Prokaryotes
E. P. C. Rocha
1155 (De)Personalized Medicine
R. I. Horwitz et al.
1156 Red Wine, Toast of the Town (Again)
H. Yuan and R. Marmorstein
1157 Caffeine Boosts Bees’ Memories
L. Chitkara and F. Peng
1159 Getting the Jump on Explosive Percolation
R. M. Ziff
1160 Guilty by Association
N. S. Joshi and T. Jacks
1161 Exceptional Properties by Design
M. Zhou

CONTENTS continued >>

Cover
Photograph of a silicon chip (area of entire chip: 33 mm²) that levitates individual atoms. Static and radio frequency voltages are applied to the array of electrodes at the center, creating an electric confinement for individual atomic ions, which hover ~0.1 mm above the chip. Such trapped ion systems are a leading physical implementation for quantum information processing. See the special section beginning on page 1163.

Photo: Curt Supplee and Emily Edwards, Joint Quantum Institute and University of Maryland; Chip fabrication: Sandia National Laboratories with support from the Intelligence Advanced Research Projects Activity

Explore our rich online offerings, including multimedia, news, Science Careers, and our two research journals—Science Signaling and Science Translational Medicine—at www.sciencemag.org

DEPARTMENTS
1121 This Week in Science
1125 Editors’ Choice
1128 Science Staff
1225 New Products
1226 Science Careers
REPORTS

1185 Avoiding a Spanning Cluster in Percolation Models
Y. S. Cho et al.
In a percolation model that avoided bridge bonds, the continuity of transitions depends on lattice dimensionality.
>> Perspective p. 1159

1187 Emergence of a Measurement Basis in Atom-Photon Scattering
Y. Glickman et al.
The scattering of single photons from a trapped ion may shed light on the process of decoherence and quantum measurement.

1191 A Transforming Metal Nanocomposite with Large Elastic Strain, Low Modulus, and High Strength
S. Hao et al.
The use of a shape-memory metal alloy as a matrix better exploits the inherent elastic properties of niobium nanowires.
>> Perspective p. 1161

1194 Terrestrial Accretion Under Oxidizing Conditions
J. Siebert et al.
Earth's core formed under conditions similar to those that formed the most common meteorites.

1198 A Reconstruction of Regional and Global Temperature for the Past 11,300 Years
S. A. Marcott et al.
Current global average surface air temperature is warmer than that for all but a small fraction of the past 11,300 years.

1202 Caffeine in Floral Nectar Enhances a Pollinator's Memory of Reward
G. A. Wright et al.
Caffeine at concentrations found in flowers helps individual honeybees remember where to find associated nectar.
>> Perspective p. 1157

1205 Prairie Dogs Disperse When All Close Kin Have Disappeared
J. L. Hoogland
Long-term observation reveals that the presence of family members keeps a new generation of prairie dogs close to home.
>> News story p. 1136

1207 Gene Transfer from Bacteria and Archaea Facilitated Evolution of an Extremophilic Eukaryote
G. Schönknecht et al.
A mosaic of genes acquired from various phyla enable a red alga to grow abundantly in hot, acidic, and toxic niches.
>> Perspective p. 1154

1210 Cell Death from Antibiotics Without the Involvement of Reactive Oxygen Species
Y. Liu and J. A. Imlay

1213 Killing by Bactericidal Antibiotics Does Not Depend on Reactive Oxygen Species
I. Keren et al.
Tests of the oxidative damage mechanism for antibiotic killing do not support the generality of the hypothesis.

1216 Evidence for a Common Mechanism of SIRT1 Regulation by Allosteric Activators
B. P. Hubbard et al.
An interaction of the deacetylase SIRT1 with its substrate offers a possible explanation for some effects on aging.
>> Perspective p. 1156

1219 Aire-Dependent Thymic Development of Tumor-Associated Regulatory T Cells
S. Malchow et al.
Prostate tumors in mice recruit thymus-derived regulatory T cells that are specific for tissue autoantigens.
>> Perspective p. 1160

1225 Evidence for a Common Mechanism of SIRT1 Regulation by Allosteric Activators
B. P. Hubbard et al.
An interaction of the deacetylase SIRT1 with its substrate offers a possible explanation for some effects on aging.
>> Perspective p. 1156

1233 Caffeine in Floral Nectar Enhances a Pollinator’s Memory of Reward
G. A. Wright et al.
Caffeine at concentrations found in flowers helps individual honeybees remember where to find associated nectar.
>> Perspective p. 1157