When certain materials drop below a critical temperature, they enter a superconducting phase characterized by zero electrical resistance. A readily visualized signature of the superconducting state is the ability to expel magnetic fields. In this photo, a magnet placed on top of the ceramic yttrium barium copper oxide levitates as the temperature drops below 123 kelvin and the material becomes superconducting. See the special section beginning on page 189.

Photo: Takeshi Takahara/Photo Researchers, Inc.
BREVIA

205 Kepler Detected Gravity-Mode Period Spacings in a Red Giant Star
P. G. Beck et al.
Asteroseismic observations with the Kepler satellite probed the deep interior of an evolved star.
>> Perspective p. 180; Reports pp. 213 and 216

RESEARCH ARTICLES

206 Nanometer-Thick Equilibrium Films: The Interface Between Thermodynamics and Atomistics
M. Baram et al.
Model experiments show that nanometer-thick films at interfaces reduce interface energy and form an equilibrium state.
>> Perspective p. 182

209 Ribozyme-Catalyzed Transcription of an Active Ribozyme
A. Wochner et al.
A functional RNA has been synthesized by an RNA enzyme from mononucleotide building blocks.
>> Perspective p. 181

REPORTS

213 Ensemble Asteroseismology of Solar-Type Stars with the NASA Kepler Mission
W. J. Chaplin et al.
Measurements of 500 Sun-like stars show that their properties differ from those predicted by stellar population models.

216 HD 181068: A Red Giant in a Triply Eclipsing Compact Hierarchical Triple System
A. Derekas et al.
The Kepler satellite reveals details of the oscillation patterns of an evolved star in an exotic triple-star system.
>> Perspective p. 180; Brevia p. 205

218 Surface-Plasmon Holography with White-Light Illumination
M. Ozaki et al.
A technique based on light-induced electronic excitations on a metal-film surface is used for three-dimensional color displays.

220 The Hot Summer of 2010: Redrawing the Temperature Record Map of Europe
D. Barriopedro et al.
Large parts of eastern Europe experienced exceptional warmth during the summer of 2010.

224 13C NMR Guides Rational Design of Nanocatalysts via Chemisorption Evaluation in Liquid Phase
K. Tedsree et al.
Nuclear magnetic resonance spectroscopy can reveal the strength of substrate interactions with heterogeneous catalysts.

228 Oriented 2D Covalent Organic Framework Thin Films on Single-Layer Graphene
J. W. Colson et al.
Microporous covalent organic frameworks, which usually form as insoluble powders, grow as crystalline films on graphene.

231 A Virophage at the Origin of Large DNA Transposons
M. G. Fischer and C. A. Suttle
A parasite of a giant DNA virus that rescues the host has been shown to be the progenitor of a widespread transposon.

234 A Dynamic Knockout Reveals That Conformational Fluctuations Influence the Chemical Step of Enzyme Catalysis
G. Bhabha et al.
An Escherichia coli dihydrofolate reductase mutant is catalytically defective, because motions in the active site are impaired.

238 Mutations in U4atac snRNA, a Component of the Minor Spliceosome, in the Developmental Disorder MOPD I
H. He et al.
Minor RNA splicing defects can cause a major human developmental disorder.

240 Association of TALS Developmental Disorder with Defect in Minor Splicing Component U4atac snRNA
P. Edery et al.
Mutation in a small nuclear RNA hinders splicing of pre-messenger RNAs and causes the severe malformations of Taybi-Linder syndrome.
>> Perspective p. 184

243 Eosinophils Sustain Adipose Alternatively Activated Macrophages Associated with Glucose Homeostasis
D. Wu et al.
Regulation of adipose tissue macrophages by eosinophils reveals an unexpected role for eosinophils in metabolic homeostasis.
>> Perspective p. 186

247 AMP-Activated Protein Kinase Regulates Neuronal Polarization by Interfering with PI 3-Kinase Localization
S. Amato et al.
A bioenergy-sensing pathway determines axon initiation and growth in neurons.

251 Coping with Chaos: How Disordered Contexts Promote Stereotyping and Discrimination
D. A. Stapel and S. Lindenberg
Messiness makes people long for orderliness, which results in a rush to categorize and simplify.
>> Science Podcast

254 Rapid Spread of a Bacterial Symbiont in an Invasive Whitefly Is Driven by Fitness Benefits and Female Bias
A. G. Himler et al.
A Rickettsia bacterium promotes its own geographical spread by manipulating its insect host’s sex ratio and fecundity.
>> Perspective p. 185

CONTENTS continued >>
A Bacterium That Acts Like a Toothbrush

in ancient Egypt.

Tuberculosis Followed the Fur Trade

Bulk photoemission studies of iron pnictides suggest a role for orbital fluctuations in creating superconducting state.

Venus’s Southern Polar Vortex Reveals Precessing Circulation

Orbital-independent Superconducting Gaps in Iron–Pnictides

Acidification Around Oceanic Event 1a”

Response to Surface-Water Acidification Around Oceanic Event 1a”

Comment on ”Calcareaous Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

Response to Comment on ”Calcareaous Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

Trans-Endocytosis of CD80 and CD86: A Molecular Basis for the Cell Extrinsic Function of CTLA-4

Neuronal GPCR Controls Innate Immunity by Regulating Noncanonical Unfolded Protein Response Genes

Two nematode worm neurons “smell” disease and promote resistance to pathogens.

Observation of Orbital Currents in CuO

Resonant x-ray scattering is used to detect microscopic loop currents within the plane of cupric oxide.

Orbital-Independent Superconducting Gaps in Iron–Pnictides

Bulk photoemission studies of iron pnictides suggest a role for orbital fluctuations in creating the superconducting state.

Venus’s Southern Polar Vortex Reveals Precessing Circulation

D. Luz et al.

Observations with the Venus Express Orbiter reveal complex polar atmospheric dynamics.

Venus’s Southern Polar Vortex Reveals Precessing Circulation

D. Luz et al.

Observations with the Venus Express Orbiter reveal complex polar atmospheric dynamics.

Tuberculosis Followed the Fur Trade

bacterium from Europeans to native Canadians.

Selected front matter

TECHNICAL COMMENTS

Comment on ”Calcareaous Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

S. J. Gibb et al.

Full text at www.sciencemag.org/cgi/content/full/332/6026/175-b

Response to Comment on ”Calcareaous Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

E. Erba et al.

Full text at www.sciencemag.org/cgi/content/full/332/6026/175-c

SIGNALING

The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: Poly(ADP-Ribose) (PAR) Binding to Apoptosis-Inducing Factor Is Critical for PAR Polymerase–1–Dependent Cell Death

Poly(ADP-ribose) binds to apoptosis-inducing factor to trigger its release from mitochondria and induce cell death.

RESEARCH ARTICLE: Confinement of Activating Receptors at the Plasma Membrane Controls Natural Killer Cell Tolerance

S. Guo et al.

PERSPECTIVE: ATM Is a Redox Sensor Linking Genome Stability and Carbon Metabolism

A. Krieger and M. Ralser

By linking genome stability, the cell cycle, and carbon catabolism, ATM emerges as a central regulator of cancer cell metabolism.

PERSPECTIVE: All Stressed Out Without ATM Kinase

J. J. P. Perry and J. A. Tainer

Oxidation activates ATM, allowing this kinase to mediate antioxidant responses.

PRESENTATION: Proteomic Analysis of Integrin Adhesion Complexes

A. Byron et al.


SCIENCE CAREERS

www.sciencemag.org/career_magazine

Free Career Resources for Scientists

Taken for Granted: Doctoral Candidate

B. L. Benderly

Postdoc-turned-politician Peter Ferguson hopes to bring his scientific insight to Canada’s federal Parliament.

Q&A: Philip Phillips—A Roundabout Approach to Superconductivity

E. Pain

Unconventional training allowed theoretical condensed matter physicist Philip Phillips to tackle superconductivity using a novel and indirect approach.

>> Superconductivity section p. 189

SCIENCE NOW

www.sciencenow.org

Highlights From Our Daily News Coverage

Tuberculosis Followed the Fur Trade

Genetic fingerprints reveal movement of deadly bacterium from Europeans to native Canadians.

The Challenge of the Second Century

D. M. Holtzman et al.

The first article in our State of the Art Review series explores the challenges of translating research advances into clinical treatments for Alzheimer’s disease.

RESEARCH ARTICLE: Genital HIV-1 RNA Predicts Risk of Heterosexual HIV-1 Transmission

J. M. Barton et al.

One partner of a fusion gene found in gastric cancer, CD44-SLC1A2, may contribute to the tumor’s abnormal metabolism.

Tuberculosis Followed the Fur Trade

bacterium from Europeans to native Canadians.

Observation of Orbital Currents in CuO

Resonant x-ray scattering is used to detect microscopic loop currents within the plane of cupric oxide.

Acidification Around Oceanic Event 1a”

Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

Comment on ”Calcareaous Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

S. J. Gibb et al.

Full text at www.sciencemag.org/cgi/content/full/332/6026/175-b

Response to Comment on ”Calcareaous Nannoplankton Response to Surface-Water Acidification Around Oceanic Event 1a”

E. Erba et al.

Full text at www.sciencemag.org/cgi/content/full/332/6026/175-c

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment

5 April issue: http://scim.ag/ss040511

RESEARCH ARTICLE: Poly(ADP-Ribose) (PAR) Binding to Apoptosis-Inducing Factor Is Critical for PAR Polymerase–1–Dependent Cell Death (Parthanatos)

Y. Wang et al.

Poly(ADP-ribose) binds to apoptosis-inducing factor to trigger its release from mitochondria and induce cell death.

RESEARCH ARTICLE: Confinement of Activating Receptors at the Plasma Membrane Controls Natural Killer Cell Tolerance

S. Guo et al.

PERSPECTIVE: ATM Is a Redox Sensor Linking Genome Stability and Carbon Metabolism

A. Krieger and M. Ralser

By linking genome stability, the cell cycle, and carbon catabolism, ATM emerges as a central regulator of cancer cell metabolism.

PERSPECTIVE: All Stressed Out Without ATM Kinase

J. J. P. Perry and J. A. Tainer

Oxidation activates ATM, allowing this kinase to mediate antioxidant responses.

PRESENTATION: Proteomic Analysis of Integrin Adhesion Complexes

A. Byron et al.


SCIENCE CAREERS

www.sciencemag.org/career_magazine

Free Career Resources for Scientists

Taken for Granted: Doctoral Candidate

B. L. Benderly

Postdoc-turned-politician Peter Ferguson hopes to bring his scientific insight to Canada’s federal Parliament.

Q&A: Philip Phillips—A Roundabout Approach to Superconductivity

E. Pain

Unconventional training allowed theoretical condensed matter physicist Philip Phillips to tackle superconductivity using a novel and indirect approach.

>> Superconductivity section p. 189

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

6 April issue: http://scim.ag/stm040611

STATE OF THE ART REVIEW: Alzheimer’s Disease—The Challenge of the Second Century

D. M. Holtzman et al.

The first article in our State of the Art Review series explores the challenges of translating research advances into clinical treatments for Alzheimer’s disease.

RESEARCH ARTICLE: Genital HIV-1 RNA Predicts Risk of Heterosexual HIV-1 Transmission

J. M. Barton et al.

One partner of a fusion gene found in gastric cancer, CD44-SLC1A2, may contribute to the tumor’s abnormal metabolism.

SCIENCE PODCAST

www.sciencemag.org/multimedia/podcast

Free Weekly Show

On the 8 April Science Podcast: connecting disorder and stereotyping, GM-organic coexistence, stellar variations, and more.

SCIENCE INSIDER

www.sciencemag.org/scienceinsider

Science Policy News and Analysis

http://science.sciencemag.org/
Editor's Summary

This copy is for your personal, non-commercial use only.

**Article Tools**
Visit the online version of this article to access the personalization and article tools:
http://science.sciencemag.org/content/332/6026

**Permissions**
Obtain information about reproducing this article:
http://www.sciencemag.org/about/permissions.dtl