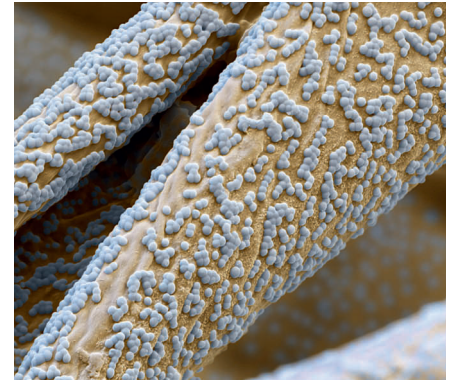




Contents



12 Full of value: Nanoparticles prevent cotton fibers in textiles from becoming wet or soiled.

PERSPECTIVES

- 08** Max Planck Center Established in Tokyo
- 08** Max Planck Society Receives Prince of Asturias Award
- 09** Martin Stratmann Succeeds Peter Gruss as President
- 09** Max Planck Research Prize 2013 Goes to Chris Field and Markus Reichstein
- 10** "Yet another man"
- 11** The Physics of Waves
- 11** On the Net

VIEWPOINT

12 Peering into the Unseen
When new technologies literally touch us, the general discussion about their opportunities and risks becomes more intense. Nanotechnology applications in medicine, nutrition and cosmetics, for example, are particular subjects of public debate. But there's a lot more to these debates than just scientific facts.

18 GEOSCIENCES

The Intertwined Earth

18 When the Air Turns the Oceans Sour

Human society has begun an ominous large-scale experiment, the consequences of which will not be foreseeable for some time yet. Massive emissions of man-made carbon dioxide are heating up the Earth. But that's not all: the increased concentration of this greenhouse gas in the atmosphere is also acidifying the oceans. Scientists at the Max Planck Institute for Meteorology in Hamburg are researching the consequences this could have.

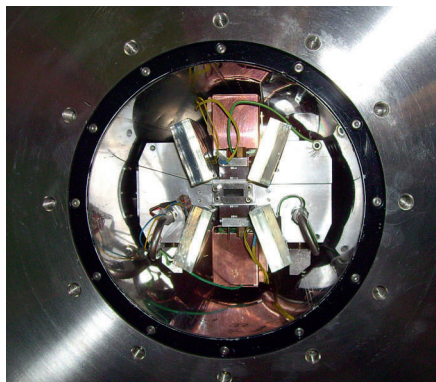
24 Tracing the Noxious Five

For many years now, a phenomenon that threatens both humans and the environment has been moving to the center of attention: the "noxious five" – nitrogen dioxide, sulfur dioxide, ozone, carbon monoxide and particulate matter. Researchers at the Max Planck Institute for Chemistry in Mainz are studying these substances with a view to clarifying the large-scale atmospheric processes associated with the bad air.

32 Earth's Breath

The amounts of carbon dioxide and other trace gases that vegetation and soil exchange with the atmosphere affect the climate in a variety of ways. Scientists at the Max Planck Institute for Biogeochemistry in Jena are analyzing this complex structure – with the aid of a global network of measuring stations and new data analysis methods.

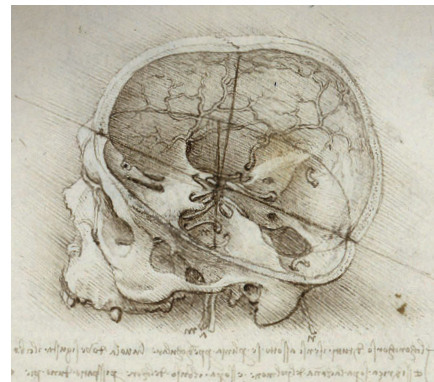
ON THE COVER: The Earth is a perfect ecosystem and the best place in the universe that we know of for life. The complex interaction of the elements earth, water and air – land masses, oceans and atmosphere – is finely balanced and works very smoothly. But the delicate interplay can easily tip. Researchers are only gradually tracking down the factors that upset the balance of our interwoven planet.



46 Full of tricks: In the experiment, muons migrate to a magnet that harbors a vessel containing hydrogen.



60 Full of talent: Nuno Maulide – A virtuoso in the lab and on the piano. The chemist also studied piano.



68 Full of detail: Leonardo da Vinci drew minutely detailed human organs and body parts using quill, ink and red chalk

FOCUS

- 18** When the Air Turns the Oceans Sour
- 24** Tracing the Noxious Five
- 32** Earth's Breath

SPECTRUM

- 40** Country Bumpkins Have More Enthusiasm for New Things
- 40** Chaos with Unfamiliar Swirling
- 41** ... and now for the weather on Mars
- 41** Charcoal in the Ocean
- 41** Revealing Games behind Bars
- 42** Herbarium Turned History Book
- 42** New Keyboard for Touchscreens
- 43** Mysterious Flashes in the Sky
- 43** Resilient Harlequin
- 44** Fountains at the Heart of a Galaxy
- 44** Mobility in the City
- 45** Preference in Mating
- 45** A Good Wire for Nanoelectronics
- 45** Chlamydia Wreaks Havoc in Genetic Material

PHYSICS & ASTRONOMY

- 46** **Physics Has a Core Problem**
Precise measurements of the proton radius yield a value that differs significantly from the value previously considered to be valid. The difference could point to some gaps in physicist's picture of matter.

BIOLOGY & MEDICINE

- 54** **More than Just Sweet**
When they hear the word sugar, the first thing most people think of is candy. Some may also think of diabetes. Researchers, in contrast, want to use sugars to develop more effective drugs and vaccines. It is hoped that these will benefit primarily poorer countries.

MATERIAL & TECHNOLOGY

- 60** **A Virtuoso with Molecules**
Personal Portrait: Nuno Maulide

CULTURE & SOCIETY

- 68** **The Body According to Leonardo**
A new look at Leonardo da Vinci's anatomical drawings shows what role the process of drawing – the genuine artistic act – played in the generation of knowledge.

FEATURES

- 03** **On Location**
- 06** **Viewpoint – Peter Gruss**
We Need a Living, Breathing System
- 76** **Flashback**
A Virologist between Two Worlds
- 78** **Max Planck Community**
78 Dinner with Nobel Laureates
80 A Celebration of Life
82 Top Ranking in the Competition for Starting Grants
- 83** **Research Establishments**
- 83** **Imprint**