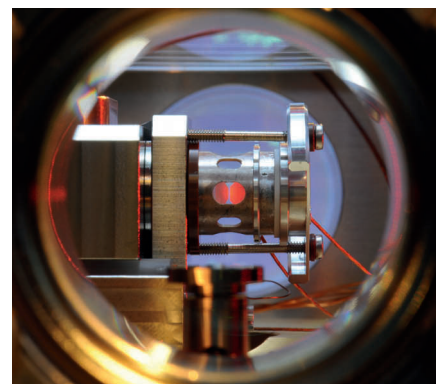




# Contents



**48** Mirror cabinet: Laser light keeps single atoms afloat in this vacuum chamber.

## 18 FOCUS

### New Energy through Chemistry

#### 18 Climate Protection in a Nanosponge

There is a surplus of carbon dioxide on Earth – and not necessarily to the advantage of the environment. Chemists, on the other hand, want to make a virtue of necessity and use carbon dioxide as a chemical raw material, which would keep the greenhouse gas out of the atmosphere.

#### 26 Hunting for Treasure among the Wood Chips

Wood waste and straw contain important substances for the chemical industry. We just have to find them and develop tools for extracting the valuable compounds and using them as energy sources.

#### 34 Carbon Acts as a Chemical Dating Agency

Almost nothing happens in chemistry without catalysts. But the reaction accelerators have one disadvantage: they often contain – sometimes rare – metals that need large amounts of energy to do their job. But maybe it is possible to do without them?

ON THE COVER: These xylose crystals, imaged under polarized light, resemble an abstract painting. Xylose is also known as wood sugar, and is released in depolymerization processes. In these experiments, researchers are looking for chemical compounds that can be used as energy sources and raw materials.

#### PERSPECTIVES

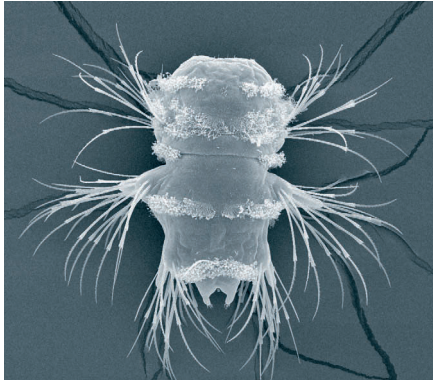
- 08 New Partnership in Fusion Research
- 08 A Test for Risk-Takers
- 09 “We need to explain the benefits of transgenic animals”
- 10 Europe’s Courts under Pressure to Reform
- 10 Research on the Move
- 11 More Prizes for the Competition “Jugend forscht”
- 11 On the Net

#### VIEWPOINT

- 12 **Biology – A Systemic Redefinition?**  
The terms systems biology and synthetic biology are currently experiencing a boom. But what do they actually signify in scientific terms? An analysis.

#### FOCUS

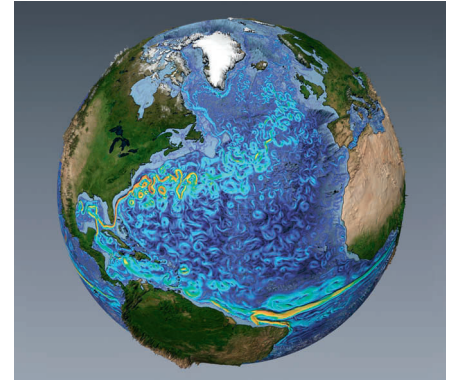
- 18 Climate Protection in a Nanosponge
- 26 Hunting for Treasure among the Wood Chips
- 34 Carbon Acts as a Chemical Dating Agency



**56** Swimming lessons: Several ciliary bands help the ragworm larva move.



**64** Bone work: A researcher tests the antibacterial coating of an implant screw.



**72** Water swirls: This snapshot shows the ocean currents at a depth of 75 meters.

## SPECTRUM

- 42** Mine, Mine, Mine!
- 42** Catalyst for Cleaner Air
- 43** Direct Genetic Exchange
- 43** Wandering Thoughts
- 43** Powerhouse in the Crab Nebula
- 44** Fossil Planets
- 44** Molecules as Radio Stations
- 45** Followers Foster Democracy
- 45** From Specialist Straight to Multitalent
- 45** Sweet against Sugar
- 46** Climate Archive in Glass Sponge
- 46** Hungry Dwarf Galaxy
- 47** Microlenses – Formed Naturally
- 47** Nasal Spray for Panic Attacks
- 47** Smallest Data Storage Unit in the World

## PHYSICS & ASTRONOMY

- 48** **Training Atoms**  
A drop of water or a microorganism is made up of countless atoms that escape our everyday experience. Nevertheless, researchers are using single atoms to study the interaction between light and matter.

## BIOLOGY & MEDICINE

- 56** **How Light Gets on the Nerves**  
The larvae of the ragworm possess the simplest eyes in the world. This makes the animal a perfect model organism for studying, for instance, how sensory stimuli are relayed.

## MATERIALS & TECHNOLOGY

- 64** **Trojan Horse in the Wound Dressing**  
In German hospitals alone, 30,000 patients die every year from antibiotic-resistant infections. Researchers are aiming to outwit these bacteria with the help of specially coated dressings and implants.

## ENVIRONMENT & CLIMATE

- 72** **Climate Memory**  
A gigantic heat pump is at work in the Atlantic Ocean, supplying Europe with a pleasantly warm climate. Researchers analyzed this current, laying the foundation for an improved climate model.

## CULTURE & SOCIETY

- 78** **Experiments in Temptation**  
Every legal system in the world punishes corruption – but by no means equally. Researchers are tracking down the differences in practice through laboratory experiments at two universities in Germany and China.
- 86** **The Observer**  
Personal Portrait: Lorraine Daston

## FEATURES

- 03** **On Location**
- 06** **Spotlight – Peter Gruss**  
A Binding Formula for Women
- 94** **Flashback**  
94 The Satellite with X-ray Vision
- 96** **Max Planck Community**  
96 Navigating by the Minerva Compass  
97 Debate 2.0 – How the Science Gallery Talks in Berlin Work
- 98 Switching Seats for Future Prospects
- 99** **Research Establishments**
- 99** **Imprint**