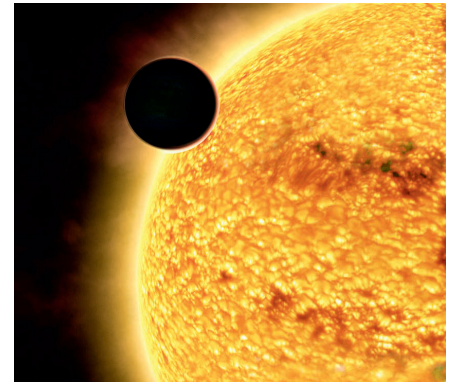




# Contents



**48** Playing with light: An exoplanet passes in front of its parent sun during a stellar eclipse.

## 20 FOCUS

### Biodiversity

#### 20 Census at the Zoo

Although everyone is talking about species protection, the lack of information about the species that need to be conserved can be quite shocking. Researchers are using special methods to gather important data about the lives of endangered animals. In this way, it is hoped that threatened animal species can be protected more effectively in the future.

#### 26 Life on the Move

Whether birds that crisscross the globe, whales that navigate the vastness of the oceans or wildebeast on the African savannas – the major animal migrations in our world present an incomparable spectacle. Researchers are now using miniature transmitters on a wide variety of species to track their exact destinations and how they get there.

#### 34 The Sea as a Gene Pool

The oceans are full of bacteria. Outwardly, they all look much the same, but there are many different species living a variety of ways of life. This bacterial diversity can be analyzed with the aid of metagenomics.

ON THE COVER: Whether in the water, in the air or on land – there is a wide variety of life. This biodiversity is considered to be the foundation of life, which is why scientists concern themselves both with diversity within and between species and with the diverse habitats.

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### VIEWPOINT

- 14 **Freedom Creates Knowledge**  
Knowledge changes constantly as research probes the validity of existing knowledge and converts ignorance into new knowledge. Research may even also create new ignorance. An analysis of the conditions most conducive to drawing back the curtains.

### FOCUS

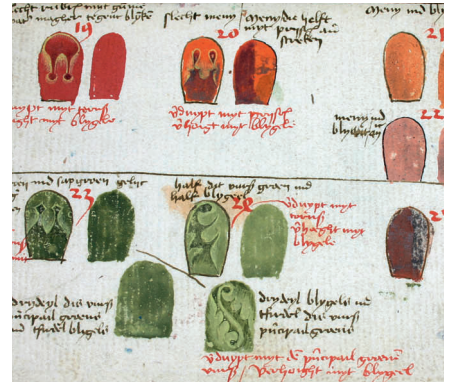
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**54** Playing with particles: Peter Hommelhoff used to move basketballs; today he moves electrons.



**70** Playing with elements: Wind parks in the sea could help produce more energy.



**78** Playing with colors: This page shows the mixtures and combinations used to illustrate books.

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**PHYSICS & ASTRONOMY**

- 48 The Search for a Second Earth**  
Astronomers have now discovered nearly 800 planets orbiting distant stars. So far, only three of them have been found to potentially offer life-sustaining conditions. However, there are probably many second Earths in the Milky Way. But how can traces of life be detected on exoplanets?
- 54 A Ball Artist in the Quantum Arena**  
Personal Portrait: Peter Hommelhoff

**MATERIALS & TECHNOLOGY**

- 62 The Power Grid's Got Rhythm**  
New forms and sources of energy need new power lines as well. In the future, a larger number of small, distributed wind and solar installations in place of a smaller number of large power plants are projected to supply Germany with energy. Scientists are investigating how the high-voltage grid will respond to this and how it can be optimized.

**ENVIRONMENT & CLIMATE**

- 70 Powerhouse Earth**  
Our planet is at work: The sun drives the wind, the waves and the water cycle. Plants store the energy from light in sugar, supplying the fuel of life. Researchers are investigating how much energy flows in these processes and how much of this could be used on a sustainable basis.

**CULTURE & SOCIETY**

- 78 The Science of the Studio**  
Not only did they create impressive works of art, they also took an interest in alchemy, mathematics and the natural sciences. Now researchers are studying how artists in the early modern era discovered, depicted and circulated new knowledge.

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