

# BCAS

June 2021 Vol.35 No.2 Pages 65 – 128

#### Editor-in-chief

HOU Jianguo

**Executive Vice Editor-in-chie** 

GAO Hongjun

Vice Editors-in-chie

Mu-ming Poo, LI Guojie, FU Bojie, GUO Huadong, WANG Keqiang and YANG Liuchun

Editor
SONG Jianlan
Associate Editors
GUO Haiyan
YAN Fusheng
Design & Layout

Tel/Fax: 86-10-62542631
Email: bulletin@mail.casipm.ac.cn
P.O. Box 8712, Beijing 100190, China

Sponsored by the Chinese Academy of Sciences Published by Science Press Printed by Beijing Reach Mine Printing CO., LTI

Domestic subscription (1 year): 400 yuan. Domestic and overseas distribution: Science Press

Launched in 1987, the *Bulletin of the Chinese Academy of Sciences (BCAS*, ISSN 1003-3572) is a quarterly published every March, June, September and December. Copyright © 2020 by the Chinese Academy of Sciences. Please note that the views expressed in *BCAS* are those of the authors, and are not necessarily those of the Academy or the editors. For subscription, please contact Science Press at +86-10-64017032, mazhiyong@mail.sciencep.com.

BCAS has licensed CNKI to digitally copy, compile, publish, and disseminate the full text of our journal by network. The remuneration paid by our journal includes the copyright fee of CNKI. All authors who submit articles to our journal for publication are deemed to agree with the above statement. If there is any objection, please indicate at the time of submission, we will deal with it accordingly.

# Contents



China and Russia jointly release a roadmap and a guideline for partnership concerning the International Lunar Research Station, to help potential partners across the world identify their roles in possible participation.

66 In This Issue

68 China and Russia Welcome International Participation in Lunar Research Station Project

#### **InBrief**

70 Book Launch:
English Edition of *DIIS Theory*and Methodology in Think Tanks
Released by Springer

71 New Energy Technology Research

- Opportunities and Challenges
Officially Released in Beijing

#### **InFocus**

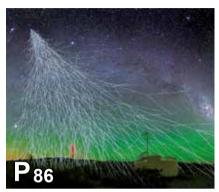
- 72 Zhurong Touches down on Mars for in situ Scientific Investigations
- 74 China's Technological Research Capabilities See a Steady Growth

## Special

76 Towards Next-generation Rice
- Following the Footprints of Late
Academician YUAN Longping



Zhurong, the first Mars rover of China, roams on Mars surface since May 22 to investigate the local environments around the landing site.



An international consortium working on the Large High-Altitude Air Shower Observatory detects 12 sources of ultrahigh-energy photons that might help unveil an unexplored universe.



How will the Einstein Probe (EP) mission, a CAS-ESA project, help us understand the violent side of the cosmos? Let's hear what Dr. Erik Kuulkers, the ESA Project Scientist for EP would say.

••••••

# Highlight

86 UHE Photons on the "Knee"
Pose Challenges to Dominant Model on Origins of
Cosmic Rays

## Int'l Cooperation

- 94 Working together to Explore Transients in the X-ray Universe
  - An Interview with Dr. Erik Kuulkers, ESA Project Scientist for Einstein Probe

## ThinkTank Report

99 Developing Nutritious Crops, Improving the Nutritional Quality of Farm Produce in China

#### **Science Watch**

#### **Basic Research**

- 103 FAST Detects First Evidence for the 3D Spin-velocity Alignment in a Pulsar
- 104 New FAST Discoveries Shed Light on Pulsars
- 106 Evidence for PeVatrons, the Milky Way's Most Powerful Particle Accelerators

#### Life Sciences

- 108 Genome Analyses Reveal the Origin of Specialized Body Plan in Flatfishes
- 110 Machine Learning Helps Mining Microalgal Cell Factories for Reducing Carbon Emissions
- 112 Researchers Discover the Neural Circuit Mechanism Underlying an Intelligent and Flexible Decision-Making Behavior
- 115 Discovery of New Echolocating Mammalian Lineage
- 117 Tuning the Length of Fatty Acids in Oil-producing Microalgae
- 119 Researchers Unravel Genome-wide Variations in the Secondary Structure of Human Genomic DNA
- 120 New Mechanism Revealed for Tumor-associated Macrophages to Regulate the Fate of CD8\* T Cells

#### **Earth Sciences**

- 122 Study Sheds Light on Population History of Northern East Asia
- 124 New Findings Unveil a Missing Piece of Human Prehistory
- 126 Scientists Discover Two New Species of Ancient, Burrowing Mammal Ancestors
  - $-\,120\mbox{-million-year-old}$  animals evolved "scratch digging" traits independently