

深 空 探 测 学 报(中 英 文) (双 月 刊)

第 9 卷 第 1 期 2022 年 2 月

目 次

专刊：深空探索科学技术与应用

(主持人：吴伟仁 院士，探月与航天工程中心)

- 基于微型核反应堆的月表高可靠可扩展配电网架设想 夏彦，黄文，冯宇，等 (3)
- 稀疏观测模式的“嫦娥四号”中继星轨道确定 刘思语，黄勇，李培佳，等 (14)
- “嫦娥四号”中继星再生伪码测距数据定轨精度分析 牛东文，段建锋，欧阳琦，等 (21)
- 可移动月球着陆器系统设计与实验验证 贾山，周向华，陈金宝，等 (29)
- 月球永久阴影区着陆点选取要求的高分辨率极化 SAR 数据分析 ... 柳钮滔，施贤正，徐丰，等 (42)
- “天问一号”着陆中继通信系统设计与验证 张婷，韩宇，孙泽洲，等 (53)
- 基于多源影像的“祝融号”火星车高精度定位 王稼，李达飞，何锡明，等 (62)
- 天体表面探测遥操作模拟验证系统设计与实现 李立春，李剑，王稼，等 (72)
- 地外天体采样柔性智能化系统设计与应用 邓湘金，金晟毅，郑燕红，等 (80)
- 运载火箭液氢循环预冷无传感器控制系统设计 张学英，穆晖，卢頔，等 (88)

专刊主持人简介



吴伟仁，中国探月工程总设计师，航天测控通信和深空探测工程总体技术专家，航天战略科学家。中国工程院院士，国际宇航科学院院士，全国政协常委，我国深空探测领域主要开拓者之一。获国家科技进步特等奖 3 项，一等奖 2 项。被国际宇航联合会授予世界航天最高奖。国际天文学联合会将国际永久编号 281880 号小行星命名为“吴伟仁星”。

Journal of Deep Space Exploration

Vol. 9 No. 1 (February, 2022)

CONTENTS

Special Issue: Technology and Application of Deep Space Exploration

(Guest Editor: Professor WU Weiren, Lunar Exploration and Space Engineering Center)

A High-reliability and Scalable Lunar Surface Power Distribution Network Frame Vision Based on Micro-nuclear Reactor	XIA Yan, HUANG Wen, FENG Yu, et al (3)
Determination of the Orbit of Chang' E-4 Relay Satellite Under Sparse Observation	LIU Siyu, HUANG Yong, LI Peijia, et al (14)
Regenerative Pseudo-Random Code Ranging Orbit Determination Accuracy Analysis for Chang' E-4 Relay Satellite	NIU Dongwen, DUAN Jianfeng, OUYANG Qi, et al (21)
System Design and Experimental Verification of Mobile Lunar Lander	JIA Shan, ZHOU Xianghua, CHEN Jinbao, et al (29)
Analysis of High Resolution SAR Data and Selection of Landing Sites in the Permanently Shadowed Region on the Moon	LIU Niutao, SHI Xianzheng, XU Feng, et al (42)
Design and Verification of Relay Communication System During Entry Descent and Landing for Tianwen-1 Mars Probe	ZHANG Ting, HAN Yu, SUN Zezhou, et al (53)
High Precision Localization of Zhurong Rover Based on Multi-source Images	WANG Jia, LI Dafei, HE Ximing, et al (62)
Design and Construction of a Simulating and Testing System for the Remote Operation of Planetary Surface Exploration	LI Lichun, LI Jian, WANG Jia, et al (72)
Design and Application of Flexible Intelligent System for Sampling on the Extraterrestrial Body	DENG Xiangjin, JIN Shengyi, ZHENG Yanhong, et al (80)
Design of a Sensorless Liquid Hydrogen Circulation Precooling Control System for Rockets	ZHANG Xueying, MU Hui, LU Di, et al (88)

Guest Editor Introduction

Weiren Wu is the designer-in-chief of China's Lunar Exploration Program and an overall technical expert in the aspect of aerospace telemetry and communication and deep space program, a scientist for aerospace strategy. He is the academician of Chinese Academy of Engineering, academician of International Academy of Astronautics, and the member of the Standing Committee of the Chinese People's Political Consultative Conference. He is one of the main pioneers in the deep space field in China. He has been honored with three special prizes and two first prizes of the National Science and Technology Progress Award of People's Republic of China, as well as the supreme aerospace award conferred by International Astronautical Federation. International Astronomical Union has named the asteroid No. 281880 after him in June 2020.