

月球與行星科學國家重點實驗室(澳門科技大學)(以下簡稱實驗室)由國家科技部批准,於2018年10月8日正式掛牌成立,是天文與行星科學領域首個國家重點實驗室。

The State Key Laboratory of Lunar and Planetary Sciences (hereinafter referred to as SKLplanets) (Macau University of Science and Technology) was approved by the Ministry of Science and Technology of China and established on October 8th, 2018. It is the first state key laboratory in the field of astronomy and planetary sciences.

月球與行星科學 國家重點實驗室

State Key Laboratory of
Lunar and Planetary Sciences



實驗室的成立是國家大力發展深空探測,推動粵港澳大灣區科技創新,提升澳門科技水平的重要舉措。實驗室前身為「澳門科技大學月球與行星科學實驗室——中國科學院月球與深空探測重點實驗室夥伴實驗室」。澳門科技大學於2005年開始參與「嫦娥探月工程」數據分析和研究工作,於2011年底成立了太空科學研究所,2014年4月中國科學院正式批准在澳門科技大學成立中國科學院月球與深空探測重點實驗室夥伴實驗室,同年11月19日,夥伴重點實驗室正式掛牌成立。

The establishment of SKLplanets marks an important step of developing deep-space exploration, improving scientific and technological level in Macao, and promoting innovation of Guangdong-Hong Kong-Macao Greater Bay Area. Macau University of Science and Technology (MUST) started to participate in China Lunar Exploration Project in 2005, involving data analysis and scientific research, and the Space Science Institute was built up in the end of 2011. In April 2014, Chinese Academy of Sciences (CAS) officially approved the establishment of Lunar and Planetary Science Laboratory in MUST as a co-laboratory of CAS Key Laboratory of Lunar and Deep Space Exploration.



實驗室現有研究人員及研究生等約100人,其中助理教授以上研究人員40人,包括美國科學院院士、美國工程院外籍院士、中國科學院院士、國際宇航科學院院士、台灣中研院院士、講座教授、教授、特聘教授、副教授以及助理教授等。研究團隊具有合理的學科結構、梯隊結構、以及雄厚的科研實力,這是一支茁壯成長中的深空探測科學應用核心團隊。實驗室主任由張可講教授擔任,學術委員會主任由中國科學院地球化學研究所歐陽自遠院士擔任,學術委員會副主任由中國科學院地質與地球物理研究所潘永信院士擔任。

There are around 100 researchers and postgraduate students in SKLplanets, with 40 researchers, including fellows of the US National Academy of Sciences, foreign associates of the US National Academy of Engineering, fellows of the Chinese Academy of Sciences, fellows of International Academy of Astronautics, Academia Sinica Members, Chair Professors, Professors, Distinguished Guest Professors, Associate Professors, and Assistant Professors. This research team possesses reasonable structure of discipline and echelon, as well as strong research strength, which can be seen as a core team in scientific application researches of deep space exploration. The SKLplanets director is Chair Professor Keke Zhang. The director of the SKLplanets academic committee is Academician Ziyuan Ouyang (Institute of Geochemistry, CAS) and the deputy director of the SKLplanets academic committee is Academician Yongxin Pan (Institute of Geology and Geophysics, CAS).



實驗室總體目標:建成具有國際影響力的行星科學研究中心,打造國際間行星科學高水準學術交流合作中心;參與國家深空探測重大項目,提供所需的科學支撐;培養國家所需的行星科學高質量人才,建成一支具有國際競爭力的研究團隊。

Overall objective of SKLplanets: constructing a research center on planetary sciences with international influence, building an international academic exchange and cooperation center with high standards regarding to planetary sciences, participating in major projects of China's deep space exploration, offering required scientific supports, training high-quality talents in planetary sciences, and making a research team with internationally competitive standards.

實驗室設置了“太空資訊技術”與“地球與行星科學”碩士和博士學位課程;“空間大數據分析”碩士學位課程正在籌備中。

The SKLplanets has established master's and doctoral degrees in both "Space Information Technology" and "Earth and Planetary Sciences"; a new master's degree in "Space Big Data Analysis" is being under preparation.



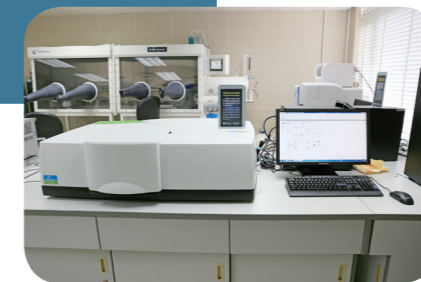
實驗室研究主要涉及行星物理學、行星地質學和行星化學等學科,研究方向包括:行星內部結構、行星內部動力學、行星表面物理、行星地形地貌、行星磁場與重力場物理、行星隕石化學和行星形成與演化。主要研究內容:圍繞月球、火星、近地小天體和氣態巨行星,利用數值模擬、數據分析、高分辨率觀測、實驗研究等各種手段開展行星內部結構和重力場、行星內部流體與磁流體動力學、行星表面撞擊坑、行星地形地貌比較研究、行星表面物質特性統計研究、行星大氣動力學、行星際空間等離子體、探樣/隕石分析等研究。

The SKLplanets research subjects mainly involve planetary physics, planetary geology and planetary chemistry. The research directions contain planetary internal structures, planetary internal dynamics, planetary surface physics, planetary topography, magnetic field and gravity field physics of planets, planetary meteorite chemistry, as well as planetary formation and evolution. Focusing on the moon, Mars, near-Earth small bodies and gaseous giant planets, the main research content is using numerical simulation, data analysis, high-resolution observation, experimental research and other means to investigate the internal structure and gravity field of planets, the dynamics of internal fluid or magnetic fluid in planets, impact craters, planetary topography, physical characteristics of planetary surface, atmospheric dynamics on planets, interplanetary space plasma, sampling/meteorite analysis.



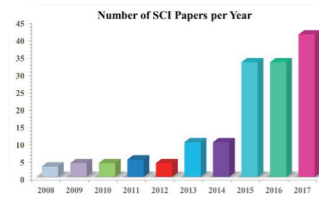
目前實驗室下設五個研究中心:樣品分析中心、小天體研究中心、行星環境模擬與內部動力學研究中心、實驗室超算中心、科學普及與傳播中心。還與廣東和香港的知名教研機構聯合組建了“大灣區地球與行星科學研究中心”。

Currently, there are five centers in the SKLplanets, namely, Center for Sample Analysis, Center for Small Planetary Bodies, Center for Planetary Environment Simulation and Internal Dynamics, Supercomputing Center and Science Communication Center. The SKLplanets also joins hands with the leading institutes in Guangdong and Hong Kong to establish the Center for Earth and Planetary Sciences in the Greater Bay Area.





實驗室在國家大力發展深空探測的戰略指引下，已開展了多項月球與行星科學的基礎研究工作，取得了重要成果，包括：國際上首次剖析了嫦娥三號著陸區域淺層結構特性及其地質演化歷史，揭示了巡視區獨特的地質特徵，這是中國嫦娥探月工程首篇 Science 論文；發展了邏輯上一致、物理上正確、數學上嚴謹的木星環流模型和反演方法，結合“朱諾號”太空船最新重力場資料，提出了兩類可能的木星環流形態；國際上首次識別出月球上一種新型火山地貌——負地形環繞穹隆構造，美國地球物理學會將該工作評選為當期亮點 Highlight 論文，並在其主辦的會刊上做了詳細報導；首次發現了太陽風等離子體對月球近月尾跡磁場的影響，被評選為當期亮點 Highlight 論文。相關研究成果已發表於 Science, PNAS, Annual Review of Earth and Planetary Sciences, Geophysical Research Letters, Earth and Planetary Science Letters, Scientific Reports 等著名學術期刊。2012年，實驗室研究項目「嫦娥探月數據的分析與研究」獲得了澳門科學技術獎中的自然科學獎三等獎。2016年6月，實驗室研究項目「嫦娥工程多波段探月資料的科學發現」獲得了澳門科學技術獎中的自然科學獎一等獎。



年份 Year	發文量排名 Ranking in Paper Numbers	被引頻次排名 Ranking in Citation Frequency
2015	2	1
2016	1	1
2017	-	-

Along with China's strategy for deep space exploration, the SKLplanets has been performing various researches and achieved critical results. Among them, the shallow structure of the Chang 'E 3 landing area was analyzed for the first time and the unique geological features were found in the patrol area. This work was published in the journal of Science, which was the first Science paper for Chang 'E Missions. The logically consistent, physically correct and mathematically rigorous circulation model and inversion method were developed for Jupiter, and two possible structures of Jupiter's circulation patterns were proposed based on the Juno gravity field data. The new type of volcanic geomorphology, the negative topographic circumferential dome, was recognized for the first time in the world. The work was selected as one of the Highlight papers by the American Geophysical Union (AGU) and was reported in detail in one of its journals. Also, the effect of solar winds on the wake magnetic fields close to the lunar surface was first discovered, which was selected as one of the Highlights in the current issue. Relevant findings have been published in the renowned journals including Science, PNAS, Annual Review of Earth and Planetary Sciences, Geophysical Research Letters, Earth and Planetary Science Letters, Scientific Reports. In 2012, the project titled "Analysis and Research of Data on Chang 'E Moon Landing Mission" won the third prize of the science and technology award in Macao. In June 2016, the other project named "Scientific Discovery of Data on Chang 'E Multi-Band Moon Landing Mission" won the first prize of the science and technology award in Macao.

實驗室研究水平快速提升，SCI 論文快速增長。據中國科學院文獻情報中心統計，實驗室在“太陽系探測領域”發文量排名和被引頻次排名都名列前茅。

According to the National Science Library of CAS, the SKLplanets ranks high in the number of published papers and citation frequency with regard to solar system exploration.



月球與行星科學國際學術研討會
International Symposium on Lunar and Planetary Science

2018.06.13 – 2018.06.15

2014年至今，實驗室與中國地質大學（武漢）每兩年聯合主辦“月球與行星科學國際學術研討會”，來自世界各地的著名學者齊聚澳門。2017年至今，實驗室每年召開“首次火星探測任務有效載荷探測技術和數據處理”學術研討會，推進科學家與工程設計人員面對面深入交流。

The SKLplanets has co-hosted "International Symposium on Lunar and Planetary Sciences" with China University of Geosciences (Wuhan) every two years, gathering well-known scholars from all over the world in Macao since 2014. The SKLplanets has also held "Symposium on Payload Technologies and Data Processing of China's First Mars Exploration Mission" every year since 2017, promoting further exchanges between scientists and engineering designers.



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