

## IAF MICROGRAVITY SCIENCES AND PROCESSES COMMITTEE

### Introduction

The IAF Microgravity Sciences and Processes Committee counts 15 committee members. Among them, there are three persons from China who represents scientists and Chinese Academy of Science. The chair of A2 Committee, V. Shevtsova, being a member of 'International Collaborative Study on Evaporation and Phase Heat Transfer in Space (2021-2023)' has visited China, on 4-11 November on the occasion of an experiment being carried out aboard the space station in the framework of this project. She was invited by Prof. Liu Qiu Sheng, who is also active member of the IAF Microgravity Sciences and Processes Committee.

### Summary

The visit proved to be both interesting and beneficial for someone who had participated in several European experiments aboard the International Space Station (ISS).

*"I had the opportunity of visiting the Technology and Engineering Center for Space Utilization (CSU) at the Chinese Academy of Sciences, and be engaged in a meeting with the staff of the International Cooperation Office. The International Cooperation Office team offered us a guided tour of the gallery showing the creation history of the Chinese Space Station", said V. Shevtsova.*

The space station, known as Tiangong, was built at a rather exceptional pace and was completed in just two years. The first module was launched on April 29, 2021, followed by the second on July 24, 2022, and the last module on October 31, 2022. Tiangong is currently designed with 14 experimental racks within an enclosed, pressurized environment. The primary objective is to provide opportunities for space-based research. The accelerated development of the Chinese

Space Station confirms China's determination to advance space exploration and research. The insights gained from our visit have deepened our understanding of the goals set by the Chinese space programme, particularly in promoting international cooperation and fostering innovation.

At present, the Chinese Space Station (CSS) is actively hosting scientific experiments within its available experimental racks. The scientific discussions in the Key Laboratory of Microgravity CAS revealed common scientific interests. The Chinese colleagues expressed openness and willingness to collaboration, which may involve the possibility of hosting our hardware in the Two-phase System Experiment Rack (TSER) rack or developing it jointly.

### Highlights

There are several interesting points to note.

During our visit, we had the opportunity to observe an evaporation experiment conducted in the Two-phase System Experiment Rack (TSER), managed by our Chinese colleague, Professor Liu Qiu-Sheng. The day before, visiting ground laboratory, we were impressed by the engineering model. Subsequently, we observed the flight model in operation in orbit. Both models were designed and developed by researchers of Professor Liu Qiu-Sheng's team itself in a one-year timeframe and then tested in the ground-based analogue of the space rack, the "Two-phase System Experiment Rack (TSER)". Additionally, the scientific team conducted the experiment a direct way itself for two days each week.

We were given access to the Payload Operation Center, where the real-time monitoring of experiments takes place. The entire team in the control room impressed us with their youthful energy, with an average age of

around 30 years. The only senior person present was the supervisor, who, at 42, led this dynamic team.

We had a privilege to be one of the first visitors of the microgravity experiment facility with electro-magnetic launch (MEFEL). The 40 m microgravity tower uses a linear motor to drive objects up and down, and provides the conditions of weightlessness for 4 s. Due to electromagnetic control, it can provide Moon and Mars conditions. The responsible person of MEFEL told us about an ambition plan to build the drop shaft of 800m

## **Future Outlook**

China's space station has made significant progress in its development, focusing on creating opportunities for space experiments and fostering a platform for scientific and technological innovation. Strengthening cooperation with China in the field of microgravity science is expected to be mutually beneficial. Moreover, the CSU office expresses its readiness to actively participate in the activities of the A2 committee. Committee Activities