

IN MEMORIAM

EMIL CHIFU (1925-1997)

This year **2017** marks the **20th year** from the death of Professor **Emil Chifu**. This year also signifies **40 years** from the first scientific research project proposed by Professor **Chifu** and accepted for exploring in cosmos by **NASA** (National Aeronautics and Space Administration) of the United States of America.

The prominent Romanian scientist, Professor Emil Chifu was an outstanding physical chemist, recognized by the international scientific community. He was one of the founders of the modern science of colloids, surfaces and membrane phenomena, thermodynamics and hydrodynamics of thin layers formed by surface active substances self-assembled into supramolecular structures at liquid interfaces [1].

Professor Emil Chifu has created a modern research school in thermodynamics and physical chemistry of colloids and surfaces, at the Faculty of Chemistry and Chemical Engineering, “Babes-Bolyai” University of Cluj-Napoca (UBB) [1-7]. Currently, this school is known as the Center of Research in Physical Chemistry and it is accredited in the UBB.

Professor Emil Chifu was the *first Romanian scientist* whose original research proposal “Surface Flow of Liquids in the Absence of Gravity”, based on the highest rank scientific results [8], was selected in 1977 by NASA, of the USA, and after being rigorously valued by NASA, it was approved on the 28th of March, 1978, to be experimented on Space Laboratory (SpaceLab) in 1981. This research project proposed by Professor Emil Chifu represents the *first Romanian cosmic experiment* approved by the NASA of USA in 1978, and it refers to *two types* of space investigations: ♦surface flow between two liquid surfaces joined by surface channels and ♦surface flow on a liquid drop in the absence of gravity; both were planned by NASA to be realized on the *first flight* of the *Drop Dynamics Module* (DDM) known as “*Chifu’s experiment*”. The DDM experiment was scheduled by NASA to be explored on the SpaceLab-3.

On the basis of this research project, a *Framework Agreement (FA)* was settled between the Romanian Commission for Space Activities (CRAS) and the NASA of USA, as reported by Ioan Ursu, the president of the National Council for Science and Technology (CNŞT) in Romania, in the address no. 2460/16th December 1978 to the Ministry of National Education and Instruction.

The preparatory experiments in the laboratory phases were performed within the framework of a contract between UBB, Professor Emil Chifu being the project responsible and simultaneously the chair of the physical chemistry department and the CNȘT for the period of 1977-1980.

The setup model of *Chifu's experiment* was performed in the Jet Propulsion Laboratory (JPL) of the California Institute of Technology, Pasadena, USA in 1981, and it was implemented on the DDM in the NASA mission of the SpaceLab-3.

Professor Chifu and his research team studied the dynamics of a "free" liquid drop immersed in another liquid with equal density, in simulated microgravity laboratory conditions in UBB, Romania. Valuable theoretical and experimental results have been advanced by professor Chifu and his co-workers aiming at exploring the drop dynamics in cosmos, on SpaceLab-3, in which the microgravity conditions were rigorously satisfied.

The investigation of the professor Chifu's proposal in space conditions is a *premiere* in the study of the drop dynamics in imponderability, because the implied physical and chemical phenomena are of a major interest, both for the science and technology of liquids in the cosmic space and for industrial process as well as for examination of cell movements and biological membrane mobility.

The space experiment of professor Chifu has started the Romanian multi-disciplinary frontier research in the physical chemistry of thin films; over 60 published papers of which we recorded some [9-25] have been awarded with the "Gh. Spacu" Prize by the Romanian Academy in 1983. Professor Chifu became Emeritus Professor in 1990 at Babes-Bolyai University of Cluj-Napoca.

He published over 160 research articles and 14 books; 4 books were revised and completed posthumously by his collaborators [26-29].

The results of the scientific investigations in domains such as: thermodynamics of irreversible phenomena, liquid/liquid extraction, studies on nickel carbonyl powders, on sulphurous ores, on the foaming power of detergents have been implemented in the economic sphere on the basis of the research contracts concluded with important mining centres in Deva and Baia Mare, with chemical industries in Victoria, Ploiesti, Fagaras, as well as with the Central for drugs and cosmetics, in Bucharest.

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