University of Crete
Department of Physics

Physics Colloquium

Thursday, 26 September 2024 | 17:00 – 18:00, Seminar Room 3rd Floor

From Nonlife to Life: Unraveling the Origins of Life on Early Earth

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ABSTRACT

Since the landmark experiments by Miller and Urey, it has been proposed that lightning could play a crucial role in synthesizing life's building blocks from abiotic molecules. Arguments have been offered against this hypothesis based on what is thought to be the composition of early Earth's atmosphere, the fact that lightning is intermittent, and the reaction products might become too dispersed. We demonstrate that spraying room-temperature water droplets into a gas mixture containing N2, CH4, CO2, and NH3 leads to the synthesis of organic molecules (see Figure), including hydrogen cyanide, cyanoacetylene, cyanoacetic acid, glycine, and uracil, which were observed previously in the Miller-Urey discharge experiments. An explanation will be offered how water microdroplets drive these chemical transformations forming C-N bonds. It is suggested that sprays of water droplets offer a new way to form the building blocks of life on early Earth.