

“ Vacuum, the primordial imponderable matter ”

Séminaire général du Département de Physique de l'École Polytechnique

Can there be space with nothing in it?
How can the laws of physics be known in all Universe?
Why are stars same everywhere in the Universe?
How was matter created?
How can we find answers in the laboratory?

The global ground state of our Universe, the Vacuum, defines the structure and properties of the laws of physics, including the values of many, if not all fundamental constants.

The visible matter mass is due to quark-confining properties of the present day Universe, which emerged 1/30 000 of a second after the big bang. To confirm this paradigm in a local domain of space-time we recreate the physical properties akin to those of the early Universe. Establishment of this hot "Vacuum Hole" opens up the quest to study the structure of the vacuum, and to modify the vacuum properties locally. The objective is to explore the origin, and the deeper nature of the laws of physics. Exploring the vacuum we further address the dark energy dominating dynamics in our present Universe. A natural laboratory tool to investigate the vacuum structure are strong electromagnetic fields capable to short circuit the vacuum – these soon can be created using high intensity pulsed lasers.



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