Contribution ID: **6** Type: **not specified**

Standard Model and Beyond

Friday 14 March 2025 11:20 (1 hour)

We review the basic principles that lead to our current understanding of the fundamental elements of matter and their interactions, as codified in the so-called Standard Model of particle physics. Starting from the two pillars, Quantum Mechanics and the Special Theory of Relativity, and the resulting picture of interactions as the result of particle exchange, we will address the question of how particles acquire mass, the solution offered by the Brout-Englert-Higgs mechanism, and the discovery and current understanding of the so-called Higgs boson —the particle of the vacuum. We will then summarise the reasons for which, despite its success in describing essentially all experimental observations, the Standard Model is still considered to be only an effective theory, en route to some deeper, perhaps ultimate theory, along with some select examples of searches for New Physics. Finally, we will have a look at what we expect to learn from the current runs of the LHC, the HL-LHC, and eventually some future collider programs.

Presenter: SPHICAS, Paris (CERN/Athens)