

As quantum theory celebrates its 100th birthday, spectacular successes are mixed with outstanding puzzles and promises of new technologies. This article reviews both the successes of quantum theory and the ongoing debate about its consequences for issues ranging from quantum computation to consciousness, parallel universes and the nature of physical reality. We argue that modern experiments and the discovery of decoherence have shifted prevailing quantum interpretations away from wave function collapse towards unitary physics, and discuss quantum processes in the framework of a tripartite subject-object-environment decomposition. We conclude with some speculations on the bigger picture and the search for a unified theory of quantum gravity.