

Biosketch Anton Zeilinger

Anton Zeilinger, born on May 20, 1945, is an Austrian quantum physicist renowned for his groundbreaking contributions to quantum science, particularly in the areas of photon entanglement and quantum information. Driven by a deep curiosity about the fundamental workings of the universe, Zeilinger has been a pioneer in exploring the role of quantum entanglement and the foundations of quantum mechanics. In 2022, he was awarded the Nobel Prize in Physics, alongside Alain Aspect and John F. Clauser, "for experiments with entangled photons, establishing the violation of Bell inequalities, and pioneering quantum information science."

Zeilinger's scientific career began in the 1970s when he worked in neutron physics at the Atominstitut in Vienna and the Neutron Diffraction Laboratory at the Massachusetts Institute of Technology (MIT) in Cambridge. In 1979, he was appointed assistant professor at the Vienna University of Technology. He returned to MIT as a faculty member from 1981 to 1983. Between 1983 and 1990, he served as an associate professor at the Vienna University of Technology. Together with Daniel Greenberger and Michael Horne, he developed the theoretical framework for the Greenberger-Horne-Zeilinger (GHZ) state, which forms the foundation of multiparticle entanglement and later became a cornerstone of quantum physics. The experimental verification of GHZ states followed in subsequent years.

In 1990, Zeilinger was appointed Chair of Experimental Physics at the University of Innsbruck. During this period, he conducted numerous experiments on quantum state teleportation, photon entanglement, including quantum cryptography, and the realization of three- and four-photon entanglement. In 1999, he became Chair of Experimental Physics at the University of Vienna, where he led pioneering experiments such as the interference of large molecules (starting with buckyballs), tests of quantum nonlocality, and the first realization of quantum gates for future quantum computers.

From 2004 to 2013, Zeilinger served as the scientific director of the Institute for Quantum Optics and Quantum Information (IQOQI) in Vienna, an institute which he helped to establish. During this time, he conducted experiments testing Bell's inequality using cosmic sources of randomness and advanced quantum communication via satellites. He also developed foundational procedures for optical quantum communication. As Professor Emeritus at the University of Vienna since 2013 and as senior group leader at IQOQI, Zeilinger continues his research on the foundations of quantum physics.

Zeilinger has held visiting appointments at the Technical University of Munich, Humboldt University Berlin, Oxford University, and the Collège de France. He served as president of the Austrian Academy of Sciences from 2013 to 2022.

Zeilinger is a member of numerous academies and holds several honorary professorships and honorary doctorates. In addition to the Nobel Prize, he's been awarded among others the German Order Pour le Mérite, the Austrian Decoration of Honor for Science and Art, the Wolf Prize (Israel), the inaugural Isaac Newton Medal of the Institute of Physics, the John Stewart Bell Prize for Research on Fundamental Issues in Quantum Mechanics and their Applications, the Micius Quantum Prize, and the King Faisal Prize.

His deep curiosity for the fundamental nature of reality has guided Zeilinger's pioneering contributions to quantum entanglement and the foundations of quantum mechanics, transforming our understanding of the universe and inspiring advancements in science and technology.