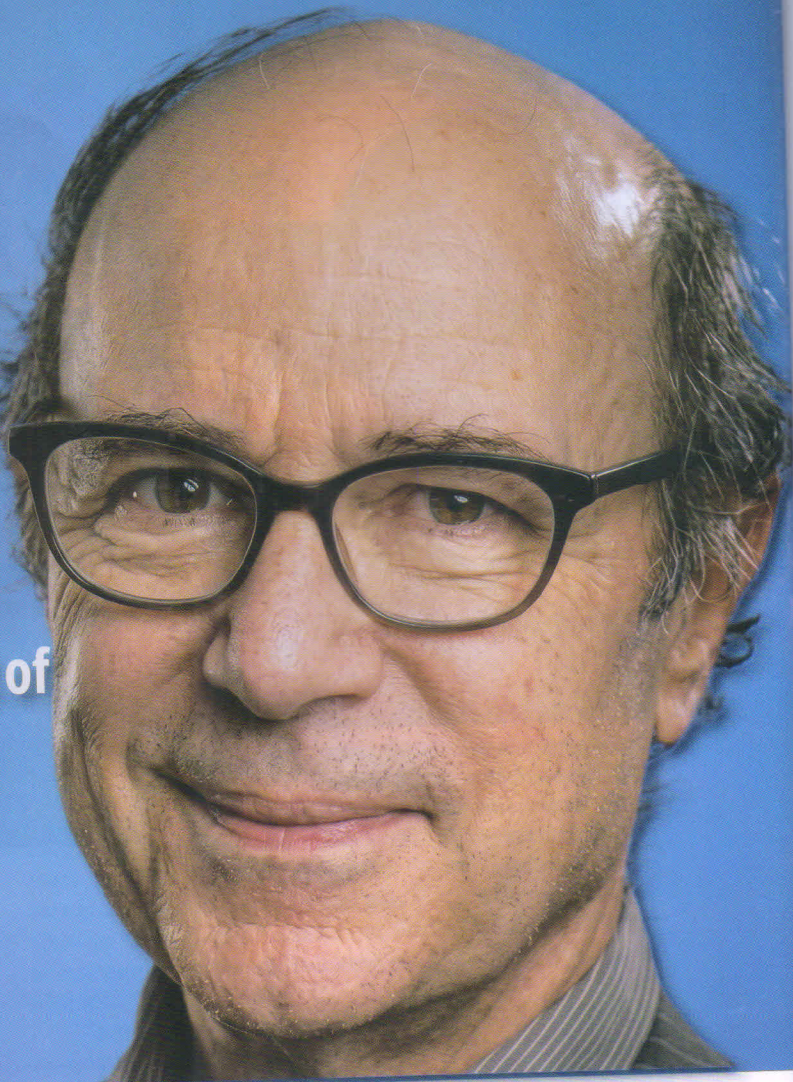


# ANYONS

New quasiparticles with “memory” that hold the promise for the development of quantum computers

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Frank Wilczek, professor of physics at MIT, who got Nobel Prize in Physics in 2004 for his seminal discovery of asymptotic freedom relating to the theory of strong interaction. He coined the term anyons in 1982 for the exotic 2-D quasiparticles

**T**HE name anyons may sound strange, or maybe somewhat annoying as well, as the nomenclature of a particle, more precisely a quasiparticle. However, of late, there has been a resurgence of interest in anyons because of their possible applications in quantum computers. First theoretically predicted during the 1970s, however, they were experimentally observed in 2020. Although anyons were first shown to exist in two dimensions in May 2025, but researchers at the University of Innsbruck observed anyons in a one-dimensional quantum system. In August 2025, scientists identified a new type of anyon known as “neglectons”.

In December 2025, MIT scientists proposed the idea of superconducting anyons, which may have potential use in designing stable qubits for quantum computers. In February 2026, a research paper published in *Nature* reported the observation of what are called anyon-trions. These trions have higher lifetimes and decoherence times, making them potential candidates for quantum information processing. Another research paper, published in the journal *Physical Review A*, found that new kinds of anyons, called bosonic-type anyons and fermionic-type anyons, may also exist.

## What are Anyons

Anyons were officially named by Frank Wilczek in 1982. In fact, Wilczek began thinking about these strange particle-like objects about 45 years ago when he was a graduate student. However, he became frustrated when he could not produce proof for the existence of these bizarre objects. When physicists asked Wilczek about their properties and also where to find them, he half-jokingly said, “Anything goes”. And this led to the nomenclature “anyon”.

In fact, anyons are not elementary particles per se. They are actually quasiparticles. However, like ordinary elementary particles, they too have measurable properties, such as location in space and perhaps mass. But unlike particles that exist in three-dimensional (3-D) space, anyons can only exist in two-dimensional (2-D) space. They can be observed, theoretically speaking, when they appear as disturbances in two-dimensional sheets of materials, and for this, temperatures near absolute zero and the presence of a strong magnetic field are some necessary conditions.

One more important fact about anyons is that, unlike particles, they don’t behave like independent entities. In other words, they can never be isolated from the system in which