

Not only the general public, but even students of physics appear to believe that the physics concept of spacetime was introduced by Einstein. This is both unfortunate and unfair.

It was Hermann Minkowski (Einstein's mathematics professor) who announced the new four-dimensional (spacetime) view of the world in 1908, which he deduced from experimental physics by decoding the profound message hidden in the failed experiments designed to discover absolute motion. Minkowski realized that the images coming from our senses, which seem to represent an evolving three-dimensional world, are only glimpses of a higher four-dimensional reality that is not divided into past, present, and future since space and *all moments of time* form an inseparable entity (spacetime).

Einstein's initial reaction to Minkowski's view of spacetime and the associated with it four-dimensional physics (also introduced by Minkowski) was not quite favorable: "Since the mathematicians have invaded the relativity theory, I do not understand it myself any more."

However, later Einstein adopted not only Minkowski's spacetime physics (which was crucial for Einstein's revolutionary theory of gravity as *curvature of spacetime*), but also Minkowski's world view as evident from Einstein's letter of condolences to the widow of his longtime friend Besso: "Now Besso has departed from this strange world a little ahead of me. That means nothing. People like us, who believe in physics, know that the distinction between past, present and future is only a stubbornly persistent illusion." Besso left this world on 15 March 1955; Einstein followed him on 18 April 1955.

This volume includes Hermann Minkowski's three papers on relativity: *The Relativity Principle*, *The Fundamental Equations for Electromagnetic Processes in Moving Bodies*, and *Space and Time*. These papers have never been published together either in German or English and *The Relativity Principle* has not been translated into English so far.

H. Minkowski

Space and Time



*H. Minkowski*

# Space and Time

## Minkowski's Papers on Relativity