

The flow of time, said Einstein, is relative. The faster you move, the slower your clock ticks compared to that of a stationary observer.

His first breakthrough paper, published in 1905, notes that if a person took a clock around the equator, that clock would move slower than a similar clock moving round the Earth's poles. **

Providing an example that time is relative, not absolute, Einstein made the following observation in his 1905 paper:

By "That train arrives here at 7 o'clock," I mean something like this: "The pointing of the small hand of my watch to 7 and the arrival of the train are simultaneous events."

So how did Einstein answer his childhood question: What would happen if he could ride a beam of light? "Nothing ... for he never could" (as an animation in this video clip depicts).

At the speed of light, according to Einstein's theory of special relativity, length shrinks to zero and time stands still.

His 1905 paper on the subject, which had no footnotes, stood alone. Einstein's thinking was totally new, and he experienced "a miracle year."

Almost as an afterthought, he applied his special relativity theory to mass and energy. More formally, he found that $E=mc^2$. Succinctly put, that means the energy, contained in any object, is equal to its mass times the speed of light squared. That translates into enormous numbers.

If none of the energy locked inside mass escapes, however, that energy cannot be observed. As Einstein reportedly said:

It is as though a man who is fabulously rich should never spend or give away a cent; no one could tell how rich he was. (Todd Siler, quoting Einstein, in *Think Like a Genius*, at page 223.)

Einstein's unparalleled "thought experiments" led him to remarkable conclusions which were never previously contemplated. As *TIME Magazine* noted, when its editors declared Einstein the Person of the 20th Century:

...he was unfathomably profound - the genius among geniuses who discovered, merely by thinking about it, that the universe was not as it seemed.

Credits:

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** Einstein submitted his paper on June 30, 1905. It was published on September 26 of that year.

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