

A One-Page Snapshot Of Relativity ¹

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The history of relativity is closely bound up with the history of light.

Back in the days of Newton, light was believed to be corpuscular² in nature.

Fresnel, reviving Huygens' theory, then showed that it behaved in a wave-like manner.

Michelson employed a method of comparing these waves to determine the relative velocity of the earth as compared to the ether³, intending thereby to also verify the existence of the latter, but derived a "zero" result instead.

Lorentz, a believer in the ether, refused to accept the unexpected zero result and proposed - at the same time as FitzGerald - a different solution: *length contraction*.

The mathematical formula applied by Lorentz to account for length contraction - the Lorentz factor⁴ - was then also applied by him to the Lorentz transformations, which soon gave rise to the theories of *frames of reference* and *time dilation*.

Then came Einstein, who simply dismissed the theory of the ether, but retained the Lorentz factor, applying it further to length contraction, frames of reference and time dilation, and even extending its application to include *mass increase*.

Without the Lorentz factor, which derives solely from defence of the ether theory⁵, relativity - a mathematical theory - would lose its fundamental equation.

¹ including footnotes!

² Small, elastic particles of light emitted by a luminous body and travelling off in straight lines.

³ the undetectable media through which light waves were thought, in those days, to move.

⁴ $1 / \sqrt{(1-v^2/c^2)}$

⁵ rejected by Einstein