

Abstract Submitted
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Why Do We Believe the Speed of Light is an Invariant of Nature? FELIX T. SMITH, retired — We believe it, obviously, because we believe in relativity, and Einstein based his treatment of relativity on what he named “The Principle of Constancy of the Velocity of Light.” From Einstein’s own writings between 1905 and about 1912 we know that in defining what this meant he was concerned especially about two issues: One was to deny the notion that the transmission of light required a privileged “ether” frame; the other was that the velocity of a light signal measured by an observer is independent of the velocity of the source that emitted the signal with respect to the observer. In relativity Einstein’s two Principles made a handy brief basis from which he could deduce the requirement of covariance under the transformations of the Lorentz group. These transformations had been developed earlier by Lorentz to conform with the results of experiments, without requiring constancy of c . The Lorentz group only requires that c be an upper bound greater than all observed particle or signal velocities. The assumption of its invariance over cosmological time seems justified mostly by its convenience as a teaching and mnemonic oversimplification.

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