# A theory of an oscillating, periodic, speed-of-light as a possible limiting value converging to an average limit.

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S.W. Mason ✉

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## Abstract

This paper seeks to adopt and solve the wave-equation for the radial propagation of light in three dimensions from the moment of the Big-Bang and during Earth-based experiments. The primary purpose is to model a propagating beam of light emitted from the singularity, outwards, and to show that its velocity is sinusoidal, meaning that its speed oscillates periodically, and is therefore variable rather than constant. It is additionally shown, by calculating an appropriate solution to the wave-equation, that the velocity of light is not only negatively damped according to the inverse radial law.

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velocity of light is not only negatively damped according to the inverse radial law, $1/r$, throughout its journey over space and time, but that this latter feature also exhibits amplitude convergence from a very large initial value to a value that is very close to what is now defined to be a constant, namely the current value denoted by $c = 299792458\,\mathrm{m/s}$. The possibility that such observations may also vary depending upon the inertial frame in which a measurement is carried out is similarly considered, along with a discussion of the related nature of mass and energy, and how the possible variability of the speed-of-light and the fabric of the space-time continuum may affect each other.

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## Keywords

Wave-equation; Transverse; Electromagnetic-wave; Radial motion; Eigen-function; Radial-solution; Redshift-drift; Speed-of-light; Displacement; Variable-velocity; Periodic; Oscillation; Convergence; Limit; Big-bang; Space-time; Neutrinos; CERN; Gran Sasso; Experiment

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