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Derivation of cosmic acceleration

and the cosmological constant

in the local universe

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Observed type Ia supernova luminosities [3,4] have revealed accelerating Hubble expansion thereby indicating an unknown energy fluid fills space or, alternatively, that the excellence of general relativity on the solar scale is not matched on the cosmic scale. The latter alternative could mean that a deeper understanding of space-time physics is appropriate for resolving “dark energy” and related problems (e.g., tension in the Hubble parameter measurements [13]). The cosmological constant in general relativity has been recalled as possibly germane to cosmic acceleration [5]. However, a satisfactory relativistic explanation of this parameter has not been given. Here it is shown, in accordance with the Lorentz transformation, that postulated inward-infinite light-speed from any point along the lookback path—each photon on the path designated/named *Lorentz photon*, substituting for the isotropic *Einstein photon* along the epochal path—yields an outward-increasing cosmic time dilation which, when “rotated” into epochal space and inserted into the Lorentz transformation, gives a linearly increasing cosmic acceleration consistent with Hubble’s law. This
leading order
result—in agreement with supernova type Ia magnitude data in the local universe (
z
0.3)—
adds to previous knowledge by giving relativistic formulations for cosmic acceleration and the corresponding cosmological constant. A closely related investigation [14] based on
empirically significant
lookback time
continues on
“too fast” cosmic-structure dynamics (e.g., of wide binary stars [15], spiral galaxies [16], and galaxy clusters [17]).

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