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From Maxwell's Electrodynamics to Relativity, a Geometric Journey FELIX T. SMITH, Retired — Since Poincaré and Minkowski recognized *ict* as a fourth coordinate in a four-space associated with the Lorentz transformation, the occurrence of that imaginary participant in the relativistic four-vector has been a mystery of relativistic dynamics. A reexamination of Maxwell's equations (ME) shows that one of their necessary implications is to bring to light a constraint that distorts the 3-space of our experience from strict Euclidean zero curvature by a time-varying, spatially isotropic term creating a minute curvature $K_{\mathrm{curv}}(t)$ and therefore a radius of curvature $r_{\mathrm{curv}}(t) = K_{\mathrm{curv}}^{-1/2}(t)$ (F. T. Smith, Bull. Am. Phys. Soc. 60, #2, Abstr. V1.00294, March, 2015). In the light of Michelson-Morley and the Lorentz transformation, this radius must be imaginary, and the geometric curvature K must be negative. From the time dependence of the ME the rate of change of the curvature radius is shown to be $dr_{\mathrm{curv}}/dt = ic$, agreeing exactly with the Hubble expansion. The imaginary magnitude is the radius of curvature; the time itself is not imaginary. Minkowski's space-time is unjustified. Important consequences for the foundations of special relativity follow.

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