Abstract Submitted
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A New View of Relativity and its Consequences for the Dirac Equation FELIX T. SMITH, retired — In 1907 and 1908 Minkowski established the foundations of the 4-dimensional tensor description of the electromagnetic field and the associated relativistic geometry with its metric sum $ds^2 = dx_1^2 + dx_2^2 + dx_3^2 - c^2dt^2$. Knowing no physical source for the time-dependent term he introduced the drastic postulate that time itself constituted a fourth component $x_4 = ict$ in a new space-time geometry. This was rapidly accepted (but not by Poincaré) and is responsible for the partial disconnect that later developed between relativity and other domains of modern physics. It has never been reappraised in the light of the Hubble expansion of our cosmos. A new alternative relativistic geometry can now be envisaged. In it the term $-c^2dt^2$ corrects for the change with time of a radius of curvature (imaginary because the curvature is negative), $r_{curv} = ic(\tau_{Hubble} + \delta t)$, where τ_{Hubble} is evaluated at the zero of δt, so that $dr_{curv} = icdt$. The geometry represents an expanding, negatively curved 3-space, not a 4-dimensional space-time. Relativistic space and time are much more like their prerelativistic counterparts. Important consequences for the Dirac equation will be presented.

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