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A New View of Minkowski Space, and its Effects in Relativistic Quantum Mechanics FELIX T. SMITH, SRI International — Since Minkowski in 1908 announced the merger of space and time there has never been an explanation of its real-and-imaginary structure (x,y,z,ict). An explanation is now available that was unknown in 1908: The imaginary component in the 4-vector is a necessary consequence of negative curvature in the background position 3-space, and its time dependence comes from the changing curvature radius under the Hubble expansion in cosmic time (Smith, F. T., Ann. Fond. L. de Broglie [AFLB], **35**, in press, (2010)). These observations confirm an especially symmetric extension of special relativity previously reported (Smith, F. T., AFLB, **30**, 179, (2005)), based on a direct product of two Lorentz groups, one generated by velocity boosts and the other by translations in a Hubble-expanding hyperbolic position space. The symplectic symmetry of the direct product group makes it possible to extend a fully Hamiltonian dynamics and quantum mechanics smoothly throughout the relativistic regime. Some resulting changes in special relativity will be described, including fully covariant n-body relativistic Schrödinger and Dirac equations.

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