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The Calculus of Relativistic Temporal Geometry ALEXANDER MAYER, Pritzker Fellowship — Richard Feynman's unpublished 1965 gedanken experiment, discussed on pages 6062 of A. F. Mayer, On the Geometry of Time in Physics and Cosmology (April 2009), demonstrates that the principles of relativity destroy both Newton's concept of absolute time and the concept of a Newtonian gravitational equipotential surface. According to logic arising from experience, it has long been falsely assumed that no energy cost is incurred for translation over an ideally frictionless level surface in the presence of a vertical acceleration. However, that the speed of light is a limiting velocity implies that while two distinct points on such a surface can be considered to be at the same potential relative to a third point that is not on that surface, a particle translated between two such points must incur energy transfer to the accelerating field. Typically, this manifests as a redshift of electromagnetic radiation as demonstrated by "Feynman's rocket." Accurate calculation of this relativistic transverse gravitational redshift (TGR) for observable phenomena in a real-world astrophysical gravitational field requires the calculus of relativistic temporal geometry. Calculations using this technique accurately predict the following empirically observed but heretofore unexplained natural phenomena: the center-to-limb variation of solar wavelength (∼1 km/ s), the K-effect for massive main sequence stars (∼2-3 km/s), and the excess redshift of white dwarf stars (∼10-15 km/s).

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