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Quantum-optical spacetime coordinate frames and Compton acceleration WILLIAM HARTER, University of Arkansas — By carefully re-examining some details of quantum and classical optical wave interference, it is possible to give an elegant and transparent redevelopment of relativity and quantum theory in a few simple lines and figures. The key is to let optical coherent states provide spacetime coordinate frames, a kind of quantum GPS. Understanding of quantum coordinate frames, such as Casimir rotors used in molecular and nuclear theory, benefit as well from a more thorough examination of wave mechanics. Geometry of Compton effects and other optical processes are quite revealing and suggest ways to make wave nets of constant acceleration using optical elements of constant velocity.

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