

Abstract Submitted  
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**Five Decades of Lasers, Six Decades of Progress, and a Proposed Space Experiment to Test Einstein's Assumptions** JOHN L. HALL<sup>1</sup>, JILA, University of Colorado — Even though this is the 52<sup>nd</sup> year of the Laser, progress in its control and application in precision measurements is still accelerating. The Optical Frequency Comb technology exploded in 1999-2000 from the synthesis of advances in independent fields of Laser Stabilization, UltraFast Lasers, and NonLinear Optical Fibers, enabling a thousand-fold advance in optical frequency measurement, and searches (in the 17th digit) for time-variation of physical “constants.” Current advances in ultra-precise locking are making possible stable optical frequencies defined by length and the speed of light, as well as by locking lasers to the resonant frequency of atoms. These two “clocks” represent our current prototypes of the clocks postulated by Einstein in 1905 in formulating the theory of Special Relativity, which can now be tested into the 18<sup>th</sup> decimal in a proposed Space-based experiment now being planned by our Space-Time Asymmetry Research collaboration (STAR).

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