Abstract Submitted
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Constraints on the Time-Dependence of the Speed of Light from Lunar Laser Ranging FELIX T. SMITH, SRI International — With the help of lunar laser ranging (LLR) data it is proposed to establish experimental constraints on the time dependence of the velocity of light (or, with the present defined value for c, in the effective length scale). Since 1994 the LLR measures of lunar distance have been accurate to a few parts in 10^{10} [J.B.R. Battat et al., PRL, **99**, 241103 (2007)]. By a revised data analysis these may suffice to reveal changes in c over a decade if its time constant is comparable to the Hubble expansion. Accuracy could be improved by emphasizing the tectonically stable moon as a scale of length for measurements. The lunar retroreflector L2, one of four now operative, is more distant from Earth than the others by distances as great as 300 km. Sensitivity to dc/dt could be improved by closely spaced measurements of the difference between the signal times to L2 and the other reflectors, reducing the effect of terrestrial movements on the analysis. The current Apache Point project is expected to improve sensitivity by a factor of 10 or 20 [J.G. Williams et al. (gr-qc/0311021) (2003)]. Sensitivity might also be improved eventually by interferometric methods.

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