

Plenary talks (PV)

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PV III Tue 9:00 E 415

Testing quantum gravity speculations with classical experiments — •ERIC ADELBERGER — University of Washington, Seattle WA, USA

Theoretical attempts to unify gravity with the other fundamental forces and develop quantum theory of gravity suggest new phenomena that can be tested with sufficiently sensitive experiments. I will discuss two of the possible experimental signatures, violation of Einstein's equivalence principle (EP) and of Newton's inverse-square law

(ISL). The leading candidate for a unified approach, string or M-theory, predicts remarkable features that have to be hidden from normal investigations—extra space dimensions and hundreds of nominally massless particles with gravitational- strength" couplings—but can lead to small, but detectable, violations of either the EP or the ISL or both.

At present, the most sensitive probes for these new phenomena are provided by classical techniques—torsion balances and lunar laser ranging. I will review these techniques, summarize their remarkable results and discuss some of their implications.