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Energy and Relativistic Clock Rates in Five Dimensions

Fabio Cardone,[1] Mauro Francaviglia[2] and Roberto Mignani[3,4]

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In the framework of a Kaluza–Klein-like scheme, based on a five-dimensional Riemannian space in which energy plays the role of the fifth dimension, we discuss a class of solutions of the five-dimensional Einstein equations in vacuum, which allows us to recover the energy-dependent phenomenological metric for gravitation, recently derived from the analysis of some experimental data concerning the slowing down of clock rates in the gravitational field of Earth.

KEY WORDS : Broken Lorentz invariance ; deformed Minkowski space

The geometrical structure of the physical world — both at a large and a small scale — has been debated for a long time; after Einstein, the generally accepted view is that physical phenomena occur in a four-dimensional spacetime, endowed with a *global* Riemannian structure, which is assumed to be *locally* flat (i.e. having a Minkowskian geometry).

[1] Universit'a della Tuscia, Istituto di Genio Rurale, Via S. Camillo De Lellis, I-01100 Viterbo, Italy and C.N.R. - GNFM

[2] Dipartimento di Matematica, Universit'a di Torino, Via C. Alberto, 10, I-10123 Torino, Italy and C.N.R. - GNFM

[3] Dipartimento di Fisica "E. Amaldi", Universit'a di Roma "Roma Tre", Via della Vasca Navale, 84, I-00146 Roma, Italy. E-mail: mignani@amaldi.fis.uniroma3.it

[4] I.N.F.N. - Sezione di Roma 1, c/ o Dipartimento di Fisica, Universit'a di Roma "La Sapienza", P.le A.Moro 2, I-00185 Roma, Italy

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