Preprint Series in Particles and Cosmos Physics

nº IPARCOS-UCM-25-011

Equivalence principles in Weyl transverse gravity

by Ana Alonso-Serrano, Luis J. Garay, Marek Liska

February 2025

Plaza de las Ciencias, 1 28040 Madrid, Spain

www.ucm.es/iparcos/

IPARCOS

INSTITUTO DE FÍSICA DE PARTÍCULAS Y DEL COSMOS

UNIVERSIDAD COMPLUTENSE MADRID

INSTITUTO DE FÍSICA
DE PARTÍCULAS Y DEL COSMOS

IPARCOS

Abstract

There exist two consistent theories of massless, self-interacting gravitons, which differ by their local symmetries: general relativity and Weyl transverse gravity. We show that these two theories are also the only two metric descriptions of gravity in 4 spacetime dimensions which obey the equivalence principle for test gravitational physics. We further analyse how the weaker formulations of the equivalence principle are realised in Weyl transverse gravity (and its generalisations). The analysis sheds light on the behaviour of matter fields in this theory.

UNIVERSIDAD
COMPLUTENSE
MADRID