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Motion of test particles in spacetimes with torsion and nonmetricity

We derive the equations of motion of a test particle with intrinsic hypermomentum in spacetimes with both torsion S and nonmetricity Q (along with curvature R). Accordingly, S and Q can be measured by tracing out the trajectory followed by a hypermomentum-charged test particle in such a non-Riemannian background. The test particle is approximated by means of a Dirac δ-function. Thus we find a tangible way to observe and measure the effects of torsion and nonmetricity. We apply our insight and evaluate how far-reaching the so-called 'geometrical trinity of gravity' really is.

Primary author: Dr IOSIFIDIS, Damianos (Scuola Superiore Meridionale, Napoli)

Presenter: Dr IOSIFIDIS, Damianos (Scuola Superiore Meridionale, Napoli)

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