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Observable traces of nonmetricity: constraining metric-affine gravity

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In this talk we will argue that, in generic metric-affine theories of gravity, non-linear $R_{(\mu\nu)}$ terms in the action do not introduce new degrees of freedom, but rather couple the rest of the degrees of freedom of the theory among themselves. At a perturbative level, this leads to a set of effective interactions among the matter degrees of freedom suppressed by a heavy mass scale that controls deviations from the Einstein-Hilbert action. From the geometrical point of view, we will see that we can associate these interactions to a piece of the nonmetricity tensor that is also suppressed by such heavy scale. Thus, one can see these interactions as a physical effect related to nonmetricity in generic metric-affine theories of gravity. We will also see how these effective interactions can be used to set bounds on metric-affine theories where nonlinear terms involving $R_{(\mu\nu)}$ occur in the action.

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