

Projective Gauge Theory and Thomas-Whitehead Gravity

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Abstract: In 2D, Einstein's theory of general relativity becomes trivial. Yet when one studies the symmetries of 2D through string theory, a new field, dubbed the diffeomorphism field, rise from the algebra of reparameterization. We show that this field has meaning in higher dimensions through the ubiquitous notion of geodesics and projective connections. By using the Thomas-Whitehead connection, which is a natural connection for projective geometry, we construct an action that gives the diffeomorphism field dynamics in the accompaniment of the Einstein-Hilbert action. From there we are able to describe how this field is related to Polyakov 2D gravity, augments gravitational interactions with fermions in 4D, and how it might be a component of dark energy and dark matter in 4D.

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