"Projective Gauge Gravity"

We discuss a gauge theory corresponding to projective symmetry in general relativity. Two spacetime connections are physically equivalent if they are related by a projective transformation. We build a projective gauge field using a Thomas-Whitehead connection on the bundle of volume forms over spacetime. The resulting gauge field is the higher-dimensional manifestation of the diffeomorphism field, which arises in interacting Polyakov 2D gravity. We develop a dynamical theory of projective gravity which reduces to Einstein-Hilbert general relativity in a certain gauge in four dimensions. To do so, we utilize characteristic classes of the spacetime tangent bundle.