Is the local Lorentz invariance of general relativity implemented by gauge bosons that have their own Yang-Mills-like action?

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General relativity with fermions has two independent symmetries: general coordinate invariance and local Lorentz invariance.

General coordinate invariance acts on coordinates and world indexes but leaves Dirac and Lorentz indexes unchanged.

Local Lorentz invariance acts on Dirac and Lorentz indexes but leaves coordinates and world indexes unchanged.

In standard formulations, local Lorentz invariance is implemented by the spin connection ${\omega^{ab}}_i$

$$
\begin{aligned}
{\omega^{ab}}_i &= {c^a}_j \, c^{bk} \, {\Gamma^j}_{ki} + {c^a}_k \, \partial_i c^{bk} \\
&= {c^a}_j \, c^{bk} \, \frac{1}{2} g^{j\ell} \left(\partial_i g_{\ell k} + \partial_k g_{\ell i} - \partial_\ell g_{ki} \right) + {c^a}_k \, \partial_i c^{bk}
\end{aligned}
$$

which is a tenth-order polynomial in the tetrads divided by an eighth-order polynomial in the tetrads because the metric is quadratic in them

$$
g_{ik} = {c^a}_i \, \eta_{ab} \, {c^b}_k .
$$

It may instead be implemented by gauge bosons $L^{ab}{}_{i}$ that have their own Yang-Mills-like action.

Such L bosons would couple to the spins of fermions and generate a potential that violates the weak equivalence principle and, if they are massive, also the inverse-square law.

Experiments looking for nonNewtonian potentials imply that L bosons, if they exist, interact so weakly as to be nearly stable and contribute to dark matter.