A Possible Model for Strong Gravity.

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The correct field equations after arbitrary variations in the $g_{\mu\nu}$ should be

$$(1) \quad P_{\rho\sigma}{}^{\mu\nu} - \Lambda g_{\rho\sigma} P^{\rho\mu\nu} = K T^{\mu\nu}.$$

After the identification

$$(2) \quad P^{\rho\mu\nu} \equiv g^{\rho\sigma} h^{\mu\nu} + g^{\mu\nu} h^{\rho\sigma} - g^{\rho\nu} h^{\mu\sigma} - g^{\mu\sigma} h^{\rho\nu}.$$

Equation (1) becomes

$$(3) \quad [g^{\rho\sigma} h^{\mu\nu}{}_{;\rho\sigma} + g^{\mu\nu} h^{\rho\sigma}{}_{;\rho\sigma} - g^{\rho\nu} h^{\mu\sigma}{}_{;\rho\sigma} - g^{\mu\sigma} h^{\rho\nu}{}_{;\rho\sigma}] - 2(h^{\mu\nu} + \frac{1}{2} g^{\mu\nu} h) = K T^{\mu\nu}.$$

Now we take the subsidiary equations as

$$(4) \quad (h^{\mu\nu} + \frac{1}{2} g^{\mu\nu} h)_{;\nu} = 0.$$

As a result of this, eq. (3) becomes

$$(5) \quad g^{\rho\sigma} h^{\mu\nu}{}_{;\rho\sigma} - \frac{1}{2} g^{\mu\nu} g^{\rho\sigma} h_{;\rho\sigma} + \frac{1}{2} g^{\rho\nu} g^{\mu\sigma} h_{;\rho\sigma} + \frac{1}{2} g^{\rho\nu} g^{\mu\sigma} h_{;\sigma\rho} + 2\Lambda(h^{\mu\nu} - g^{\mu\nu} h) = K T^{\mu\nu}.$$

Taking the trace of eq. (5) we get

$$(6) \quad -6\Lambda h = K T, \quad i.e. \quad h = -\frac{KT}{6\Lambda}.$$

Thus for the empty-field equations $h=0$ and from eq. (4) $h^{\mu\nu}{}_{;\nu}=0$. Equations (5) now become (since $T^{\mu\nu}=0$ and $T=0$)

$$(7) \quad g^{\rho\sigma} h^{\mu\nu}{}_{;\rho\sigma} + 2\Lambda h^{\mu\nu} = 0.$$

At the origin we have

$$(8) \quad \square h^{\mu\nu} - 2\Lambda h^{\mu\nu} = 0, \quad h^{\mu\nu}{}_{;\nu} = 0, \quad h = 0,$$

i.e., the Dirac-Fierz-Pauli system of spin-2 equations.