

Do We Have a Theory of Everything?

By Dr. Norbert Schwarzer

We start with the following scaled metric tensor and force it into the Einstein-Hilbert action [1] variational problem as follows:

$$G_{\alpha\beta} = g_{\alpha\beta} \cdot F[f] \rightarrow \delta W = 0 = \delta \int_V d^n x \sqrt{-G} \cdot R^* \quad (1)$$

Here G denotes the determinant of the metric tensor from (1) and R^* gives the corresponding Ricci scalar. Performing the variation with respect to the metric $G_{\alpha\beta}$ results in:

$$0 = \left(\boxed{R_{\alpha\beta} - R \frac{g_{\alpha\beta}}{2}} + \frac{1}{4F^2} (F_{,\alpha} \cdot F_{,\beta} (3n-6) + g_{\alpha\beta} F_{,c} F_{,d} g^{cd} (4-n)) \right. \\ \left. - \frac{1}{2F} \left(F_{,\alpha} g^{ab} g_{\beta b, a} - F_{,\beta} g^{ab} g_{\alpha b, a} + F_{,d} g^{cd} \left(g_{\alpha c, \beta} - \frac{1}{2} n g_{\alpha c, \beta} - \frac{1}{2} n g_{\beta c, \alpha} \right) \right. \right. \\ \left. \left. + \frac{1}{2} n g_{\alpha \beta, c} + \frac{1}{2} g_{\alpha \beta} g_{ab, c} g^{ab} \right) \right) \delta G^{\alpha\beta} \quad (2) \\ \left. + (n-1) \left(\frac{1}{2F} \left(-\frac{n}{(n-1)} F_{,d} g^{cd} g^{ab} g_{ac, b} \right) + \frac{g^{ab} F_{,a} \cdot F_{,b}}{4F^2} (n-6) \right) \cdot \frac{g_{\alpha\beta}}{2} \right)$$

and shows us that we have not only obtained the classical Einstein Theory of Relativity [2] (see boxed terms exactly giving the Einstein Field Equations in vacuum), but also a set of quantum field equations for the scaling function F , clearly playing the role of the wave-function. It was shown in our previous publications [3, 4, 5, 6, 7] that these additional terms are clearly quantum equations fully covering the main aspects of relativistic classical quantum theory. So, we conclude, that we indeed have a Quantum Gravity Theory or Theory of Everything, as one also calls it, at hand.

References

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