ERRATA

Page 12: The equation numbers (3.12)—(3.19) must be shifted by one, to match the citations in the text.

Pages 16, 18: A macro misfired. Where it says $\partial x^\mu u^\mu$ read: $\frac{\partial x^\mu}{\partial u^\alpha}$.

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Page 29, Eq. (5.33), instead of $G^\nu_{\kappa\alpha}$ read $\Gamma^\nu_{\kappa\alpha}$.

On page 57, Eq. (11.6) should read:

$$ds^2 = -A dt^2 + B dr^2 + C r^2 (d\theta^2 + \sin^2 \theta d\varphi^2),$$ (11.6)

Please replace Equation (15.21) on page 83 by the following:

Since there are no further kinetic terms this Lagrangian produces directly a term in the Hamiltonian:

$$H_2 = -\int L_2 d^3 \vec{k} = \int \frac{1}{2k^2} T_{0a}^2 d^3 \vec{k} = \int \left( \frac{\delta_{ij} - k_i k_j / k^2}{2k^2} \right) T_{0i}(\vec{k})T_{0j}(\vec{-k}) d^3 \vec{k} =$$

$$= \frac{1}{2} \int T_{0i}(\vec{x}) [\Delta(\vec{x} - \vec{y})\delta_{ij} - E_{ij}(\vec{x} - \vec{y})] T_{0j}(\vec{y}) d^3 \vec{x} d^3 \vec{y} ;$$

(15.21a)

with $\partial^2 \Delta(\vec{x} - \vec{y}) = -\delta^3(\vec{x} - \vec{y})$ and $\Delta = \frac{1}{4\pi |\vec{x} - \vec{y}|}$,

whereas $E_{ij}$ is obtained by solving the equations

$$\partial^2 E_{ij}(\vec{x} - \vec{y}) = \partial_i \partial_j \Delta(\vec{x} - \vec{y}) \quad \text{and} \quad (x_i - y_i) E_{ij}(\vec{x} - \vec{y}) = 0,$$ (15.21b)

so that

$$E_{ij} = \frac{\delta_{ij}}{8\pi |\vec{x} - \vec{y}|} - \frac{(\vec{x} - \vec{y})_i (\vec{x} - \vec{y})_j}{8\pi |\vec{x} - \vec{y}|^3}.$$ (15.21c)

In $L_3$ we find that $h_{00}$ acts as a Lagrange multiplier.