Erratum: Regularization of instabilities in gravity theories **[Phys. Rev. D 97, 024008 (2018)]**

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The equations of motion for ghost-based spontaneous growth are missing some terms in this published paper. The two main modifications are that Eq. (4) should read

$$\nabla_\mu [(-8\pi\tilde{T}A_\partial^4\alpha_\partial + 1)\nabla^\mu\phi] = m_\phi^2\phi,$$

and Eq. (12) should read

$$\nabla_\rho [(-8\pi\tilde{T}A_F^4\alpha_F + 1)F^{\rho\mu}] = m_X^2X^\mu.$$

Note that the terms lacking in the published version, $\nabla^\mu\phi\nabla_\mu(\tilde{T}A_\eta^4\alpha_\eta)$ and $F^{\rho\mu}\nabla_\rho(\tilde{T}A_F^4\alpha_F)$, do not appear in the principal part of the linearized equations. Consequently, they do not affect our main conclusions about the existence of ghost-based spontaneous growth for scalars or vectors.

The correction to ϕ equation above is also reflected in three other equations. First, Eq. (5) changes to

$$(-4\pi A_\partial^4\beta_\partial\tilde{T} + 1)\square_g\phi \approx m_\phi^2\phi + 4\pi A_\partial^4\beta_\partial\nabla_\mu\tilde{T}\nabla^\mu\phi.$$

Second, Eq. (6) changes to

$$g^{\mu\nu}\partial_i^2\phi + \dots \approx (-4\pi A_\partial^4\beta_\partial\tilde{T} + 1)m_\phi^2\phi.$$

Third, Eq. (8), the modified Tolman-Oppenheimer-Volkoff (TOV) equation, changes for ϕ as

$$\begin{aligned}\phi' &= \chi/\sqrt{1-x}, \\ C_\chi\chi' &= -[C_\nu\nu'/2 + 2/r]\chi + \gamma^{-1}m_\phi^2\phi/\sqrt{1-x},\end{aligned}$$

where

$$\begin{aligned}C_\chi &= 1 - 16\pi A_\partial^4\gamma^{-1}\chi^2 \times [(4\alpha_\partial^2 + \alpha'_\partial)(-\tilde{\rho} + 3\tilde{p}) - \alpha_\partial^2(-\tilde{\rho}' + 3)(\tilde{\rho} + \tilde{p})], \\ C_\nu &= 1 + 8\pi A_\partial^4\alpha_\partial\gamma^{-1}(-\tilde{\rho}' + 3)(\tilde{\rho} + \tilde{p})\end{aligned}$$

with $\tilde{\rho}' \equiv d\tilde{\rho}/d\tilde{p}$ and $\alpha'_\partial \equiv d\alpha_\partial/d\eta$.

The neutron star in Fig. 1 is based on the original erroneous modified TOV equations and hence is not a valid nonlinear solution. Nevertheless, it qualitatively reflects all the main features of a spontaneously scalarized star through a ghostlike instability, such as the cusp in the scalar field which still occurs for the corrected equations.

There is also a minor typo in Eq. (11) where the correct definition is $\eta_F = F_{\mu\nu}F^{\mu\nu}/2$, i.e., the 1/2 factor is missing in the original published version.