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Anisotropic Einstein Yang-Mills Higgs Dark Energy

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In the context of the dark energy scenario, the Einstein Yang-Mills Higgs model in the SO(3) representation was studied for the first time by M. Rinaldi (see JCAP **1510**, 023 (2015)) in a homogeneous and isotropic spacetime. We revisit this model, finding in particular that the interaction between the Higgs field and the gauge fields generates contributions to the momentum density, anisotropic stress and pressures, thus making the model inconsistent with the assumed background. We instead consider a homogeneous but anisotropic Bianchi-I spacetime background in this paper and analyze the corresponding dynamical behaviour of the system. We find that the only attractor point corresponds to an isotropic accelerated expansion dominated by the Higgs potential. However, the model predicts non-negligible anisotropic shear contributions nowadays, i.e. the current universe can have hair although it will lose it in the future. We investigate the evolution of the equation of state for dark energy and highlight some possible consequences of its behaviour related to the process of large-scale structure formation. As a supplement, we propose the "Higgs triad"as a possibility to make the Einstein Yang-Mills Higgs model be consistent with a homogeneous and isotropic spacetime.

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