

# Review of: "Dark Energy as an intrinsic property of Matter"

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**Potential competing interests:** No potential competing interests to declare.

1. In section "III. Homogeneous cosmology", subsection "A. The Friedmannian framework", the author denied the existence of a cosmological constant,  $\Lambda=0$ . But further in subsection "B. The matter model of SPM", he induced by hand the parameter  $\beta=-1$  in the "dark energy equation of state", that is, he considered a cosmological constant again as a dark energy ( $w_{\Lambda}=-1$ ). It's a logical dead end.

2. The author used the concept of the scalar field model with an equation of state in a virial equilibrium as a fluid analog of the matter SPM model. The scalar field can play the role of both matter (with a stiff equation of state,  $w=1$ ) and dark energy ( $w=-1$ ) in the state of virial equilibrium (section "section III. Homogeneous cosmology", subsection "D. Mapping SPM to a minimally coupled scalar field"). Having presented the equations for energy density and pressure (Eq. 26) and the Klein-Gordon equation for the scalar field (Eq. 27), the author did not specify that these are the equations of **quintessence** scalar fields. According to Eq. 26, the equation of state parameter of the quintessence scalar field in virial equilibrium is  $w=-1$ , so the equation of state parameter of the quintessence scalar field coincides with the equation of state of vacuum (the cosmological constant), so their nature is the same. Which is an erroneous assumption.

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