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## 3-form cosmology: phantom behavior, singularities and interactions

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The latest cosmological observations by the Planck collaboration (and combined with others) are compatible with a phantom like behavior ( $w < -1$ ) for the dark energy equation of state that drives the current acceleration of the Universe. With this mindset we look into models where dark energy is described by a 3-form field minimally coupled to gravity. These models have the advantage, when compared to a scalar field, of accommodating more naturally cosmological-constant- and phantom-like behaviors. We show how the latter happens for a fairly general class of positive valued potentials and, through a dynamical system approach, we find that in such cases the 3-form field leads the Universe into a Little Sibling of the Big Rip singular event into the future. In this work we explore the possibility of avoiding such singularity via an interaction in the dark sector between Cold Dark Matter and the 3-form field. For the kind of interactions considered we deduce a condition for replacing the LSBR by a late time de Sitter phase. For specific examples of interactions that meet such condition we look for distinctive imprints in the statefinder hierarchy  $\{S_1^{(3)}; S_1^{(4)}\}$ ,  $\{S_1^{(3)}; S_1^{(5)}\}$ , and in the growth rate of matter,  $\epsilon(z)$ , through the composite null diagnosis (CND).

### Summary

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