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Title:	A massive field-theoretic model for Hodge theory
Authors:	Krishna, S. (/jspui/browse?type=author&value=Krishna%2C+S.)
Keywords:	4D massive Abelian 2-form gauge theory Bosonic symmetry Nilpotent symmetries
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Abstract:	Within the framework of Becchi–Rouet–Stora–Tyutin (BRST) formalism, we show that the four (3+1)-dimensional (4D) massive Abelian 2-form gauge theory (without any interaction with matter fields) is a model for the Hodge theory because its discrete and continuous symmetry transformations (and their corresponding Noether conserved charges) provide the physical realizations of the de Rham cohomological operators of differential geometry at the algebraic level. For this purpose, we incorporate the pseudo-scalar and axial-vector fields which appear in the theory with negative kinetic terms (but with proper definition of mass). The negative kinetic terms, for the above fields, are essential so that our theory could respect the discrete symmetry transformations which provide the physical realizations of the Hodge duality operation in the domain of differential geometry. Thus, our present endeavour, not only provides the physical realizations of all the mathematical ingredients connected with the de Rham cohomological operators of differential geometry, it also sheds light on the existence and emergence of fields with negative kinetic terms. We discuss the implications and relevance of the latter fields in the context of current models of dark matter and dark energy as well as the bouncing models of Universe.
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