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Extended SU(2) Proca theory

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In this work, we explore the construction of a vector-tensor theory with a SU(2) global symmetry in the vector sector as a proposal for a modified theory of gravity. We start with a general Lagrangian containing terms involving symmetric and antisymmetric combinations of the covariant derivatives of the field. Then, we study the degeneracy of the full theory to determine whether it can be healthy or not. Thus, we find relations among some of the free functions in the theory to guarantee the degeneracy. We find that there are several ways in which the kinetic matrix can be turned degenerate. Finally, we take the scalar limit to check whether the resulting theory is also degenerate and present the set of linear combinations that are degenerate both at the vector and the scalar levels.

Author: MAURICIO NIETO GUERRERO, Carlos

Co-authors: Dr RODRÍGUEZ GARCÍA, Yeinzon (Universidad Industrial de Santander); Dr GALLEGO CA-DAVID, Alexander (Universidad de Valparaíso)

Presenter: MAURICIO NIETO GUERRERO, Carlos

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