



High Energy Physics - Theory

On ghosts in theories of self-interacting massive spin-2 particles

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We consider general theories of a massive spin-2 particle $h_{\mu\nu}$ on a Minkowski background. A decomposition of $h_{\mu\nu}$ in terms of helicity eigenstates allows us to directly test whether any given theory possesses a consistent description as a massive spin-2 representation of the Poincaré group. We demonstrate (i) that any nonlinear theory with an Einsteinian derivative structure either contains ghosts or does not describe a weakly coupled spin-2 and (ii) that there exists a two-parameter family of non-Einsteinian cubic self-interactions which constitute a ghost-free massive spin-2 theory.

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