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A preferred basis of effective operators

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Operator basis in an effective field theory has always been one of the big concerns for field theorists and model builders. As we explore higher dimensional operators, it becomes common for degeneracy in a type of operators. We point out a preferred basis in the degenerate space, which contributes local amplitudes with definite total angular momentum as well as gauge quantum numbers. It has direct consequences in physics, such as selection rules in loop integrals and the indication of tree-level UV origins of the effective operators. Besides showing the proof and examples of such basis, we also introduce a code that automatically generates it for a generic effective field theory.

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