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Lorentz invariance in heavy particle effective theories

Wednesday 26 September 2012 16:30 (20 minutes)

Based on my work arxiv:1208.0601 with R. Hill and M. Solon, I will present a formalism derived from Wigner's little group that allows the construction of heavy particle effective Lagrangians with a Lorentz invariant S-matrix. In contrast to some previous approaches this is achieved directly by field transformations without calculating the Lorentz charges and their commutation relations. I will show how this connects to what is known as "reparametrization" invariance (RPI) and point out a subtlety, that leads to a break down of RPI at order 1/M^4. Our approach is easily generalized to fields of arbitrary spin or self-conjugate fields and can also be modified to be used e.g. in theories of massless fields like SCET.

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