Contribution ID: **72** Type: **not specified**

Ultraviolet properties of Lifshitz-type field theories

Thursday, 28 July 2022 16:55 (20 minutes)

We analyse some aspects of higher derivative Lifshitz-type field theories that exhibit anisotropic scaling laws near the Lifshitz fixed point, with explicit breaking of Lorentz symmetry. Specifically, anisotropic models in 3+1 dimension with dynamical exponent z=3 and with all momentum dependent vertex operators discarded, show restoration of Lorentz symmetry in the infrared region. At the same time, ultraviolet divergences are strongly smoothened and, in particular, models with Liouville-like potential show asymptotic freedom. Generalisation of this picture, that includes fermionic and gauge degrees of freedom, is discussed.

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