

Conformal symmetry as an exact symmetry with Higgs mechanism (TH colloquium)

Wednesday, 30 January 2019 14:00 (1 hour)

In theories such as asymptotically safe gravity, conformal symmetry is treated as a symmetry for the ultra-violet limit of quantum gravity. However, gravity can be formulated as a theory where conformal symmetry is exact, but broken in the same way as in the Brout-Englert-Higgs-Kibble formalism, where local gauge symmetry is still exactly valid but realised in an apparently asymmetric manner. This formally turns gravity into a renormalizable theory, except for the fact that a physically dubious particle emerges, a heavy excitation of the graviton with spin 2 but negative metric. It is not understood what exactly the role of such a particle would be, but it can be pointed out that, leaving this mystery as it is, does produce a scheme that is worth further study. It generates a system without any tuneable parameters, so it may be worth-while to investigate what the coupling parameters of such a theory would be, and check whether anything physically realistic can be produced. We must have matter added to the system, and the algebra will have to meet with rigorous constraints.

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