Institut Henri Poincaré

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String Theory in Greater Paris

Rencontres Théoriciennes

“Supergravité, théorie des cordes et théorie M”

Jeudi 22 Novembre 2018, 10:00

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Scattering amplitudes from superconformal symmetry

We study the consequences of (super)conformal symmetry of massless scattering amplitudes. The classical symmetry is potentially broken at the quantum level by infrared and ultraviolet effects. We study its manifestations on the finite hard part of the scattering process. The conformal Ward identities in momentum space are second-order differential equations, difficult to analyze. We prefer to study superconformal symmetry whose generators are first- order in the momenta. Working in a massless N = 1 supersymmetric Wess-Zumino model in 4D, we derive on-shell superconformal Ward identities. They contain an anomaly due to collinear regions of loop momenta. We derive and solve Ward identities for various scattering processes in the model. We find that the first-order differential equations, together with physically motivated boundary conditions, uniquely fix the answer. All the cases considered give rise to uniform weight functions. In particular we consider a five-point non-planar hexa- box integral with an off-shell leg. It gives first indications on the function space needed for Higgs plus two jet production at next-to-next-to leading order.

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