



Contribution ID: 655

Type: Parallel talk

Top-quark electroweak interactions at high energy

Thursday 11 July 2019 09:00 (15 minutes)

Modified interactions in the electroweak sector may lead to scattering amplitudes that grow with energy compared to their Standard Model (SM) counterparts. We present a detailed study of all $2 \rightarrow 2$ scattering amplitudes involving at least one top quark and a pair of EW bosons. We analyse the high energy behaviour of the amplitudes using the Standard Model Effective Field Theory (SMEFT) to parametrise the departures from the SM. We discuss the origin of the energy growth that arise from effective contact interactions by appealing to the Goldstone equivalence theorem and find that the amplitudes obey expected patterns of (non-)interference. The results are connected to unitary-violating behaviour in the framework of anomalous SM interactions. Therein, we identify the appearance of additional growth due to the violation of $SU(2)$ gauge symmetry that leads to substantial differences between the SMEFT and the anomalous couplings approaches. We also discuss the embeddings of the scattering amplitudes into physical collider processes, presenting the parametric SMEFT sensitivity to relevant top quark operators and paying special attention to the extent to which the high energy behaviour of the $2 \rightarrow 2$ amplitude is retained in the actual processes accessible at colliders. The effective W approximation is exploited to gain analytical insight into the embeddings of the $2 \rightarrow 2$ helicity amplitudes. Finally, we provide a compendium of processes detailing numerous directions in which the SMEFT parameter space can be accessed through high energy top quark processes in current and future colliders.

Author: Mr MANTANI, Luca (UCLouvain)**Presenter:** Mr MANTANI, Luca (UCLouvain)**Session Classification:** Top and Electroweak Physics**Track Classification:** Top and Electroweak Physics