Contribution ID: **494** Type: **Parallel Talk**

Vector boson scattering from gauge invariant perturbation theory

Thursday, 7 July 2022 15:20 (15 minutes)

Vector boson scattering (VBS) plays a central role in the search for new physics at collider experiments such as ATLAS and CMS at the LHC. Usually predictions for this kind of process are obtained using mainly perturbative approaches in fixed gauges.
In our work we investigate VBS in a manifestly fully gauge-invariant setup. To analyse the differences to gauge-fixed perturbation theory we are using lattice techniques as a non-perturbative tool as well as perturbative results obtained from a reunitarized Fröhlich-Morchio-Strocchi analysis at Born level.
Our findings show that, in a reduced SM setup, the scattering length at threshold becomes negative. This strongly indicates a non-trivial structure of the physical scalar degree of freedom. Additionally, we also analyse the impact on (differential) cross sections of this process, paving the way for an experimental detection of this yet unaccounted-for SM effect.

In-person participation

Yes

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Session Classification: Top quark and EW Physics

Track Classification: Top quark and EW Physics