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Georgi-Machacek model: A benchmark for Higgs triplets

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The measurements of the Higgs signal strengths are turning out to be very SM-like at LHC experiments. As the precision increases, the parameter space of several BSM models is starting to shrink considerably. This is puzzling, as there is evidence that the SM cannot be the whole story: the massiveness of neutrinos, the strong hypothesis of Dark Matter, the small amount of CP-violation for baryogenesis, the lack of a strong first order EW phase transition, among others. All of the aforementioned are forcing theoreticians to either do more precise loop calculations or tame more elaborate models. In this talk it will be done the later, it will be presented the Georgi-Machacek model. This model is arguably the simplest to include Higgs triplets and preserve the ρ -parameter=1 at tree-level, naturally. It also provides new features not present in doublets or singlet models: it allows for stronger Higgs to Gauge bosons couplings than the SM at tree-level, it allows for more complex symmetry breaking patterns, etc. In this project, we are exploring all of its phenomenological phases, one of which is a DM phase. We are checking the global stability of each phase against all coexisting others. We want to provide theoretical bounds to the parameter space and, in turn, check new and unique signatures for phenomenological searches.

Primary authors: Mr AZEVEDO, Duarte (CFTC-UL); Mr FERREIRA, Pedro (CFTC-UL, ISEL); Mr SANTOS, Rui (CFTC-UL); Mrs LOGAN, Heather (Carleton University)

Presenter: Mr AZEVEDO, Duarte (CFTC-UL)

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