First ECFA WORKSHOP.

Contribution ID: **39** Type: **Parallel session talk**

Searches for light scalars at LHC and interpretation of the findings

Wednesday 5 October 2022 17:43 (15 minutes)

LHC has discovered a light boson h(125), residual of EWSB in the SM and no heavy particle. More generally, one can assume that scalars due to BSM symmetry breaking mechanisms are likely to be the lightest particles produced at LHC and the only new particles reachable at future lepton colliders. From a systematic survey of LHC data, I conclude that there are 4 likely candidates, all reaching a global evidence above 4 s.d. Confronted to the most popular models, it turns out that models with triplets, as initially proposed by Georgi and Machacek (GM) in 1985, are able to interpret these candidates. Its major prediction, based on unitarity requirements, is an upper bound, 700 GeV, on the masses of all these scalars, therefore accessible to LHC and at future e+e- TeV Linear Colliders (LC) proposed by the community of particle physics. This model needs to be extended in several ways, which are naturally embedded within a SUSY version of GM, SGM, which offers a promising scenario for a global and calculable theory describing particle physics and cosmology. Quantitative predictions are given for e+e- cross sections of the relevant processes. Promising searches for HL-LHC are briefly described.

Author: RICHARD, Francois (IJCLab Orsay)

Presenter: RICHARD, Francois (IJCLab Orsay)

Session Classification: WG1: joined HTE & SRCH session

Track Classification: WG1-HTE+SRCH - Physics Potential: Higgs, top and EW joint with FIP and direct searches