WG3 Discussion

Workshop on Implications of LHC Results on TeV-scale Physics

August-September 2011

Goals:

The task of the working groups is to assess the possible interpretations of the experimental results in view of their implications for the future strategy of particle physics.

- Need to report our findings by May-June 2012

The charge for the first meeting is to summarize the experimental situation at this time, to start the discussion of possible interpretations, and to define the lines of work that should be carried out.

Questions(1):

- list of crucial questions that emerged from the discussion

- list of action items, to address the above questions

- a list of issues that should have been discussed, but there was no time (or whatever reason), and that you encourage people to look into in preparation for the next meeting

Questions(2):

- the assessment of the WG on the prospects for possible developments with the next batch of data

- proposed timeline, including your proposal for the scheduling of future (meeting after Moriond, WG3 meeting in January)

- any suggestion you may have on the practical aspects of the workshop, like format, selection and distribution of topics

General Questions that emerged from discussions:

How to present experimental results in the most useful way for theorists? This helps if we want to discuss implications

Signatures not being currently looked at?

How much better do we expect constraints to get? Are we reaching the plateau? Will only higher energy give a dramatic improvement?

Questions that emerged from discussions:

New fermions and gauge interactions + TGCs:

- New vectors- General parametrizations.

- Balance between number of independent parameters that can be used/constrained vs generality.

- Z', W': mature analyses. Have already doubled Tevatron limits (W'). Limits will improve but no large increase in limits at 7 TeV

  - Make sure that we look at wide resonances too

Questions that emerged from discussions:

New fermions and gauge interactions + TGCs:

- Single production with new mediators (large xsec but model dependent, can also have implications on other physics –compositeness, top FB, ...)-

- What will we be able to say about a sequential 4th generation? Need to be careful about how this is interpreted (other heavy quarks e.g. vector-like)

- What can we say or contribute to neutrino physics (heavy neutrinos)

Questions that emerged from discussions:

TGC:

- Effective operators vs form factors

- experimental cross-checks of validity of effective theories (\hat{s} probed vs \Lambda constrained)

Other thoughts:

- Models: don´t give up on multi-jet signatures (huge xsecs possible, some motivated by top physics)

- Models with low MET (not discussed much here?) Are we looking at those too?

Questions that emerged from discussions:

Top, Top-like BSM & Boosted Objects

- NP coupling to 3rd gen. Well-motivated

- Detailed ttbar tail measurements => crucial test of "motivated" NP

- Watch out for light new physics (top motivated but more general)

- Top asymmetry prospects? might be difficult to see if not looked for explicitly, simple modifications of on-going analyses might be very useful- A_C, tt, also important tests to constrain

Questions that emerged from discussions:

Extra dimension signatures: BH's, KK states

- Important increase of limits wrt Tevatron. Most of the gains have been made: do not expect large increase of limits with 4x the data

- Wide resonance searches are important. Very wide resonances, how do we deal with them (energy dependent width?)

- Higgs/Radion interplay.

- LED: dijet angular distributions useful, keep publishing them, recycle into/from DM

Questions that emerged from discussions:

Long-Lived particles and other weird things:

- Wide open, a lot of potential, challenging signatures, what to expect in the next months?

- Too focused (biased) on Split-SUSY?

Flavor: tau-tau? Composite Higgs

Analyzed Data by Moriond

- the assessment of the WG on the prospects for possible developments with the next batch of data

  - By the time we write the report, results will have about 4 times the data compared to what was presented at Lepton-Photon. Still have opportunity for evidence of NP to show up
  - New searches on top of updates expected? New interpretations?

Format, division of topics

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Conclusions

- …