
WG1: How to go ahead?

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on behalf of the WG1 convenors:

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\Rightarrow Input for update of European Strategy for Particle Physics

Previous activity: CERN Theory Institute: "From the LHC to Future Colliders", Feb. 9–27, 2009

Organisers: *Albert De Roeck, John Ellis, Christophe Grojean, Sven Heinemeyer, Karl Jakobs, G. W., James Wells*

“Dry run” of possible — hypothetical — scenarios of physics at the LHC with assumed 10 fb^{-1} at 14 TeV, assessment of their potential impact on the future direction of the field

Considered future options for accelerator-based facilities at the TeV scale beyond the first phase of the LHC: SLHC (HL–LHC), ILC, CLIC, LHeC, Muon Collider, . . .

Working Group Report: [*A. De Roeck et al., Eur. Phys. J. C 66 (2010) 525*]

⇒ Need to follow up those preparatory steps with investigation and interpretation of the **real LHC data**

From the LHC to Terascale Physics Workshop (LHC2TSP)

Task:

- Evaluate the implications of the current experimental situation (LHC + everything else) for TeV-scale physics
- Discuss the impact of the experimental results on the future strategy for particle physics

Working Group 1 (WG1):

Signals of electroweak symmetry breaking

WG1 topics

See task list on twiki page:

<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/WG1>

- Implications of a possible Higgs-like signal at about 125 GeV
 - How much will we know about the properties of a produced state:
 - in summer 2012?
 - with 300(3000) fb⁻¹ at the LHC?
 - What can we gain from measurements at a future facility (LC, ...)?

WG1 topics

- How well can we constrain the underlying physics scenario (taking into account also all other experimental informations) and what does this imply for the strategy for particle physics
 - if a signal at about 125 GeV gets established?
 - if the experimental situation in summer 2012 is inconclusive?
 - if a SM-like Higgs is ruled out up to $M_H \approx 600$ GeV?
- Elementary or composite Higgs, weakly or strongly coupled?
- What is responsible for the unitarization of WW scattering?
- ...

Towards the write-up

Things to consider:

- How well do the observed signatures constrain the possible physics scenario?
- What could be the impact of the results from the first phase of the LHC on the choice of the next facility and its (ultimate) energy reach and luminosity?
- What would be the possible implications for the machine and the detector design?
- ...

Skeleton draft in preparation, to be updated in view of the results from ICHEP12

**Submission deadline for input to European Strategy process:
end of July**

WG1 Sessions at the Workshop

- Wednesday morning, 11:00–13:00:
Property determination of a possible signal
- Wednesday afternoon, 14:00-18:00: “WG1 special session (\sim plenary)”, Implications of a possible new particle at about 125 GeV
- Thursday morning, 11:00–12:40:
Alternative EWSB scenarios
- Thursday afternoon, 16:30–18:10: WW scattering
- Friday morning, 09:00–11:00: Discussion on how to proceed towards the document
- Friday afternoon plenaries:
Reports from WGs and next steps