

Higgs Cross-Section Working Group

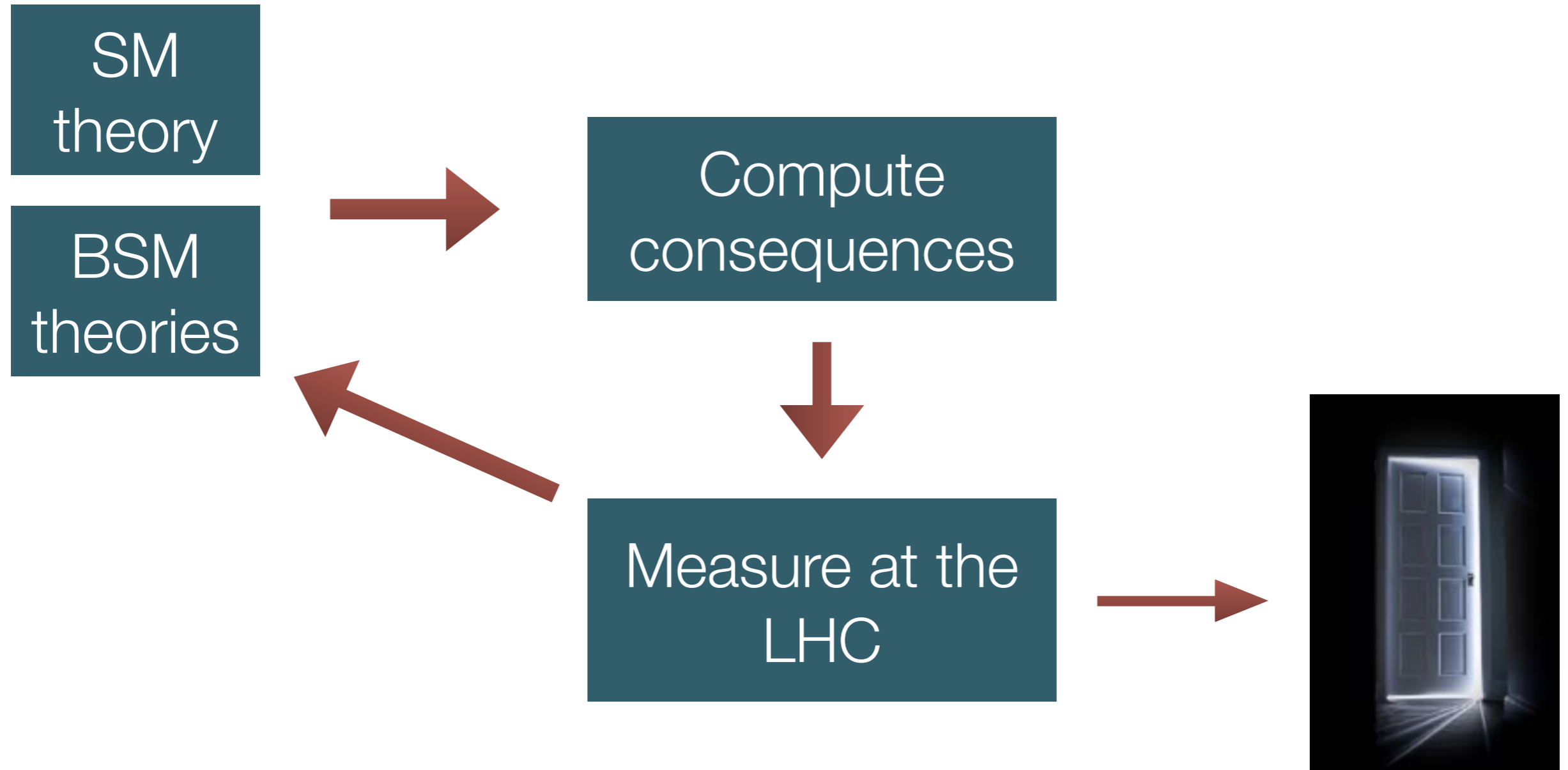
General Assembly Meeting

CERN, January 2015



On behalf of the Steering Committee

LHC physics

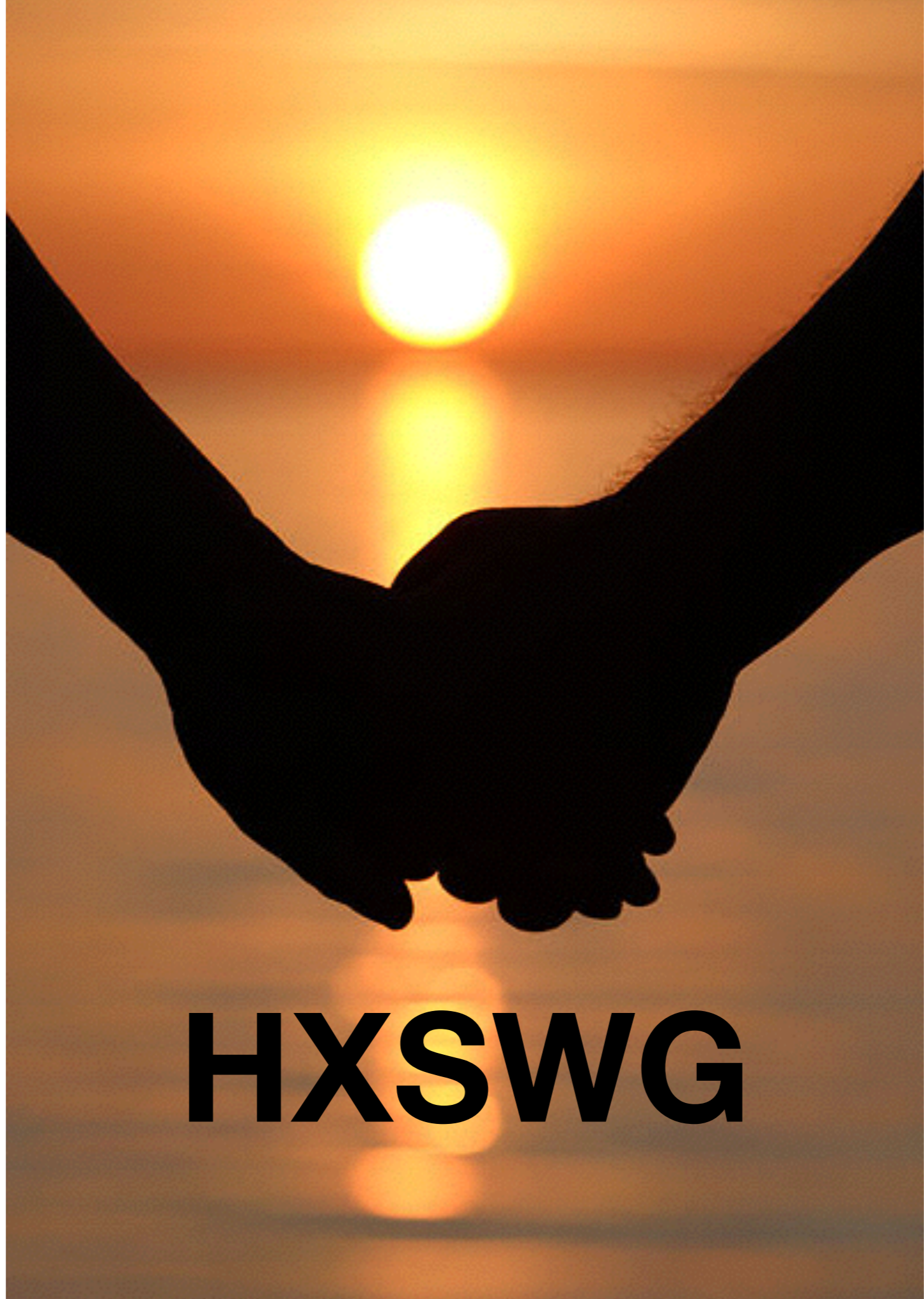


A “Feynman diagram” of finding *New Laws*

OBJECTIVES OF HIGGS PHYSICS PROGRAMME

- Higgs physics is indispensable for the exploration of the TeV scale.
- Is it the Standard Model or not? If not, what is it?
- Deviations in Higgs couplings.
- Complicated Higgs sectors, additional Higgs bosons.
- Rare and non-standard decays.
- Higgs self-interactions.
- ...

THEORY



EXPERIMENT

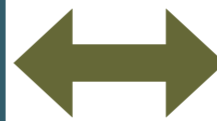
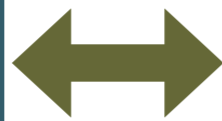
HXSWG

ggF
 BR
 ttH/tHq
 VBF/WHZH
 MCnet
 PDF4LHC
 EFT
 "kappa"
 bbH/bH
 HH
 MSSM neutral
 Exotic decays
 MSSM charged
 EW singlet/
 2HDM/
 Triplet

WG1
 Cross-
 sections
 Branching
 ratios

WG2
 Higgs
 properties/
 couplings

WG3
 Beyond the
 Standard
 Model



Theory
 Advisory
 Committee

Steering Committee

ATLAS/CMS

Extended structure of the HXSWG since June 2014

- The HXSWG has a five year long existence.
- Present structure (WG1, WG2, WG3) is young.
- Intends to cover the challenges of the Higgs post-discovery era.
- Not only Xs, but also properties and more BSM physics.
- The group has grown! Wide range of topics. Enthusiastic participation. Many lively and constructive meetings!

Rapid progress

- Progress across the board of the group's interests.
- Capitalising on NLO, NNLO, N3LO, resummation, Monte-Carlo simulation, matching and merging,... to improve cross-section uncertainties.
- Capitalising on the progress in understanding how new physics may affect Higgs properties and formulating theoretically solid and experimentally pragmatic parameterisations (effective theory/ kappa formalism / form factors)
- Extending theory predictions well established benchmarks (MSSM) to cover the quickly changing allowed parameter space and introducing new benchmarks (2HDM/NMSSM/...) as well as Higgs signatures (exotic decays)

Purpose of the meeting and next goals

- Groups and subgroups will present the progress that they have made.
- Discuss our next physics goals.
- Strategic goal: Have an impact in the analysis of the fast approaching 13-14TeV Run.
- CERN Yellow Report, with a time horizon of end 2015 and ready to be used for Moriond 2016.

Internal and official reports

- Internal reports: Document work and work plans for internal use (e.g. LHCHXSWG-INT-2015-001).
- Official reports: Serve as (interim) recommendations and can be used to represent the work of the HXSWG (e.g. LHCHXSWG-2015-001) to the experimental collaborations and the outside world. A collection of them will make up the bulk of the CERN Yellow Report.
- Report numbers issued by the Steering Committee
- Working Group conveners in collaboration with the Steering Committee will review and organise these publications.

CERN financial/logistical support

- CERN, via the LPCC, will support our activities financially and logistically.
- Possible to support local per diem for limited number of participants to our meetings.
- Active theory members of the HXSWG can request an one-year long CERN-visitor status.
- Subject to availability, CERN hostel block reservations for our meetings.