

# Explain physics to a lay audience

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# CERN backgrounders

- topics: <http://press.cern/backgrounders>  
<http://press.cern/backgrounders/higgs-boson>  
<http://press.cern/backgrounders/important-terms-higgs-research>  
<http://press.cern/backgrounders/compositeness>  
<http://press.cern/backgrounders/dark-matter>  
<http://press.cern/backgrounders/extra-dimensions>  
<http://press.cern/backgrounders/matterantimatter-asymmetry>  
<http://press.cern/backgrounders/supersymmetry>  
<http://press.cern/backgrounders/top-quark>  
<http://press.cern/backgrounders/w-prime-and-z-prime>  
<http://press.cern/backgrounders/fourth-generation-particles> outdated
- Do not reinvent the wheel! Barbora will evaluate them:  
Are they helpful, correct, complete (Ivan, Dirk: spin), up-to-date to explain our physics to a lay audience ?
- Masterclass physics info: <http://atlas.physicsmasterclasses.org>
- IPPOG web site: link or rewrite. Ebook.
- IPPOG advisory group: HP, Dirk, Thomas?
- Ivan Melo: **Higgs** potential and fundamental physics  
Eur. J. Phys. 38 (2017) 065404. <https://doi.org/10.1088/1361-6404/aa8c3d>

# What if no Higgs?

CERN Council in 2011 asked the SPC for a statement on

'The scientific significance of the possible exclusion of the Standard Model **Higgs** ... and **how it should be best communicated**'

Council cared about communication and issued the famous statement:

**'Finding the Higgs ... would be a triumph.  
Ruling it out would be a revolution.'**

<https://cds.cern.ch/record/1391403>

# What if only Higgs?

M. Mangano, 98<sup>th</sup> Plenary ECFA meeting, CERN, Nov 2015:

There is no experiment/facility, proposed or conceivable, in the lab or in space, accelerator or non-accelerator driven, which can guarantee discoveries beyond the SM...

## CERN + European Strategy:

### What if:

The Standard Model is valid till the Planck scale ?

no hierarchy, naturalness, cut-off problems

(communicate: Standard Model is a Theory - with deficiencies)

Nothing new is discovered at the LHC ?

**Nature does not guarantee a discovery at the LHC !**

Neutrinos break Standard Model - many expts. planned

# What if only Higgs?

## European Strategy:

- Why is it important to precisely measure the SM ?  
'**Higgs at work**': couplings, boson-boson-scattering:
- gravitational waves (EGO): New Astronomy
- after 500 years (Pisa: Galilei) of vector force fields  
**Higgs** opens new **Scalar Era** (gravity: tensor)
- Explain need for
  - Higgs ee factory: ILC, CLIC, FCC\_ee
  - HE pp machine: LHC-HE, FCC\_hh
- **IPPOG**: HP offers cooperation to European Strategy Group depending on reply define small Strategy task force