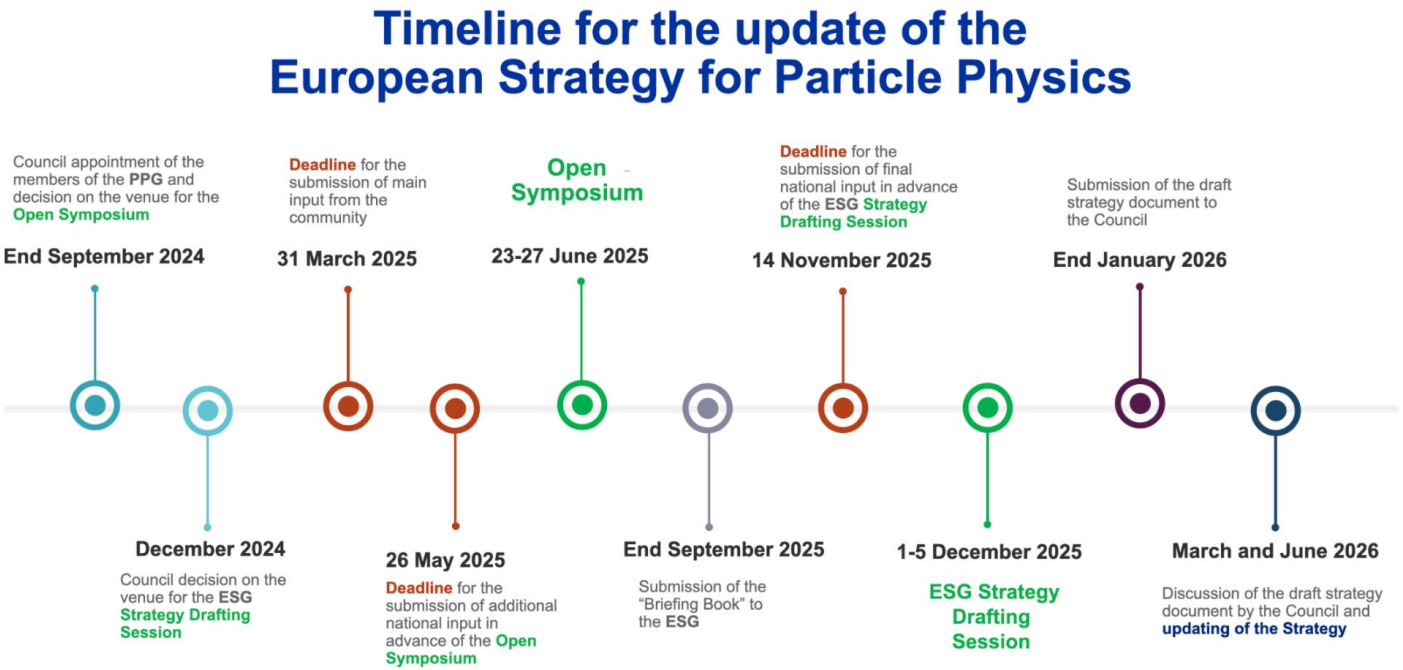
EW Working Group For European Strategy 2024-2026

Jorge de Blas
Monica Dunford

See here for more info

A reminder of the timeline



Proposed timeline for the European Strategy Update process

See here for more info

Working group areas and mandates

Working Group		
	Co-convener (PPG member)	Co-convener
Electroweak physics	Monica Dunford (DE, exp)	Jorge de Blas (ES, theory)
Strong interaction	Cristinel Diaconu (FR, exp)	Andrea Dainese (IT, exp, HI)
Flavour physics	Gino Isidori (CH, theory)	Marie-Hélène Schune (FR, exp)
BSM physics	Fabio Maltoni (BE/IT, theory)	Rebeca Gonzalez Suarez (SE, exp)
Neutrino physics and cosmic messengers	Pilar Hernandez (ES, theory)	Sara Bolognesi (FR, exp)
Dark matter and dark sector	Jocelyn Monroe (UK, exp)	Matthew McCullough (CERN, theory)
Accelerator science and technology	Gianluigi Arduini (CERN, acc)	Phil Burrows (UK, exp, acc)
Detector instrumentation	Thomas Bergauer (AT, exp)	Ulrich Husemann (DE, exp)
Computing	Tommaso Boccali (IT, exp, comp)	Borut Kersevan (SL, exp, comp)

The ESG is mandated to take into consideration:

- The input of the particle physics community;
- The implementation of the 2020 Strategy update;
- The accomplishments in recent years, including results from the LHC and other experiments/facilities worldwide, progress in the construction of the High-Luminosity LHC, the FCC Feasibility Study, and recent technological developments in accelerator, detectors and computing;
- The international landscape.

EW, Higgs and Top for this round

- For the 2020 strategy, we had extensive coverage in Higgs boson physics and EW parameters. Very limited studies of the top sector
- Anticipate input pertaining to
  - FCC-ee
  - FCC-hh - also including mid-energies
  - Linear collider facilities
  - Muon Collider
  - LHeC/ext. LHC
- To help facilitate comparisons, we will send soon some suggested benchmark processes to these communities

Possible themes and sub-themes (not final or exhaustive!)

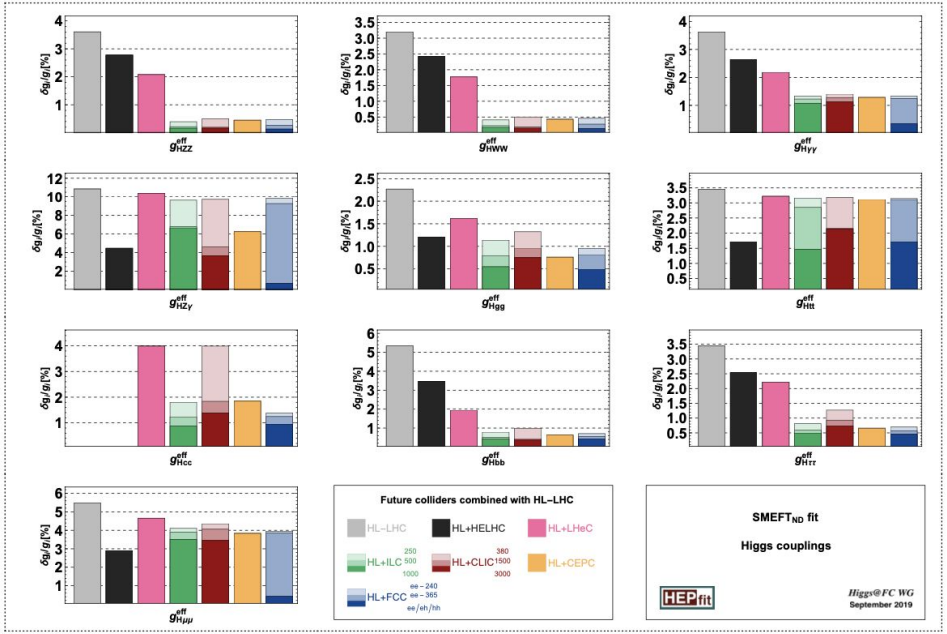
- Higgs boson physics:
  - Single Higgs
  - Top Yukawa coupling
  - Higgs self coupling(s)
  - Precision Theory
- Electroweak physics:
  - EWPO
  - Multi-boson
  - Top EW coupling
  - Precision Theory
- Global
  - Interplay between different measurements
  - Complementarities/Synergies

Thoughts on possible benchmarks

- Higgs (single-Higgs couplings including SMEFT)
- HH and Higgs potential (Higgs self coupling)

Rather extensively studied for 2020 round. Interesting updates could include (again non-exhaustive)

- large expected improvements to HH from HL-LHC,
- projections for mid/full energy hh colliders,
- Top Yukawa couplings
- interplay between SMEFT and BSM



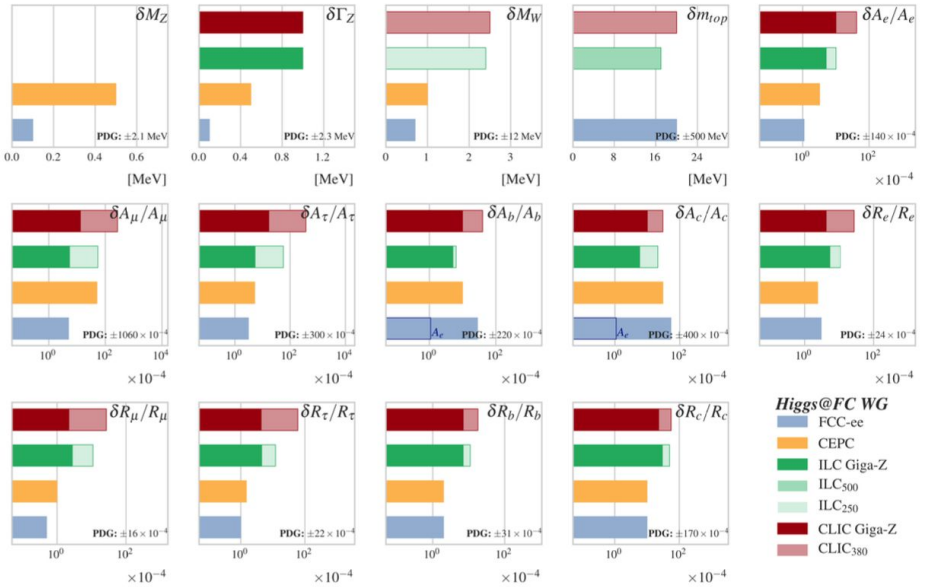
From [1910.11775]

Thoughts on possible benchmarks

- Precision EW (mH, mW, mTop, Z width, sin2thetaW, etc)

Interesting (non-exhaustive) updates could include

- Longitudinal scattering,
- projections for mid/full energy hh colliders like top mass
- Other top benchmarks like tZ or tW?
- Top-quark sector in the global EFT fit



From 1910.11775

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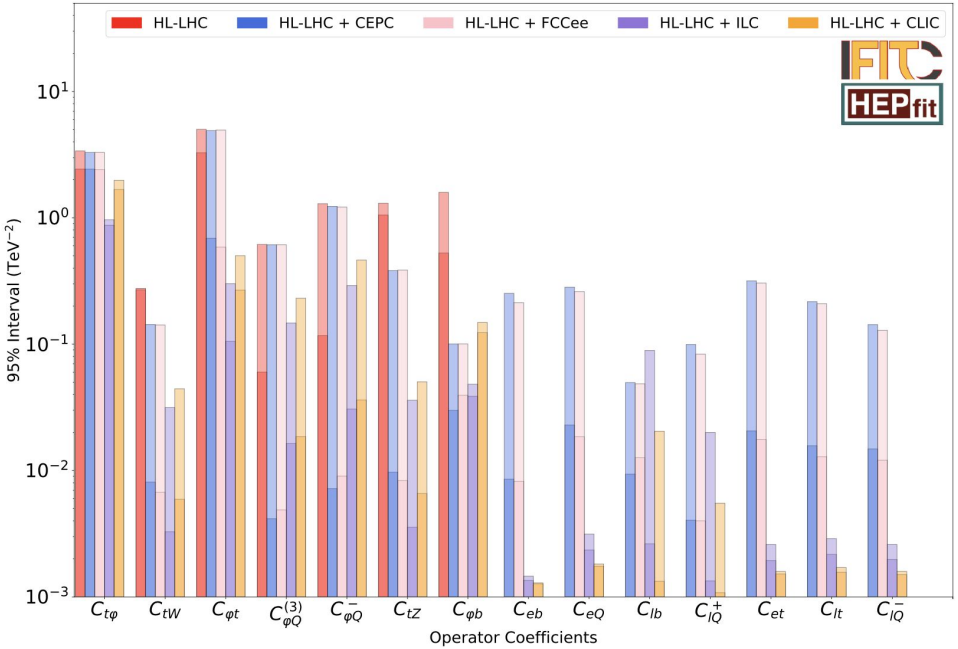

From [2206.08326](2206.08326)

Conclusions

- The 2024-2026 strategy is just getting started
- To help facilitate comparisons, we are planning to submit a list of ‘benchmark processes’ to be considered by the respective communities
- We appreciate any feedback on what Top benchmarks could be interesting to consider