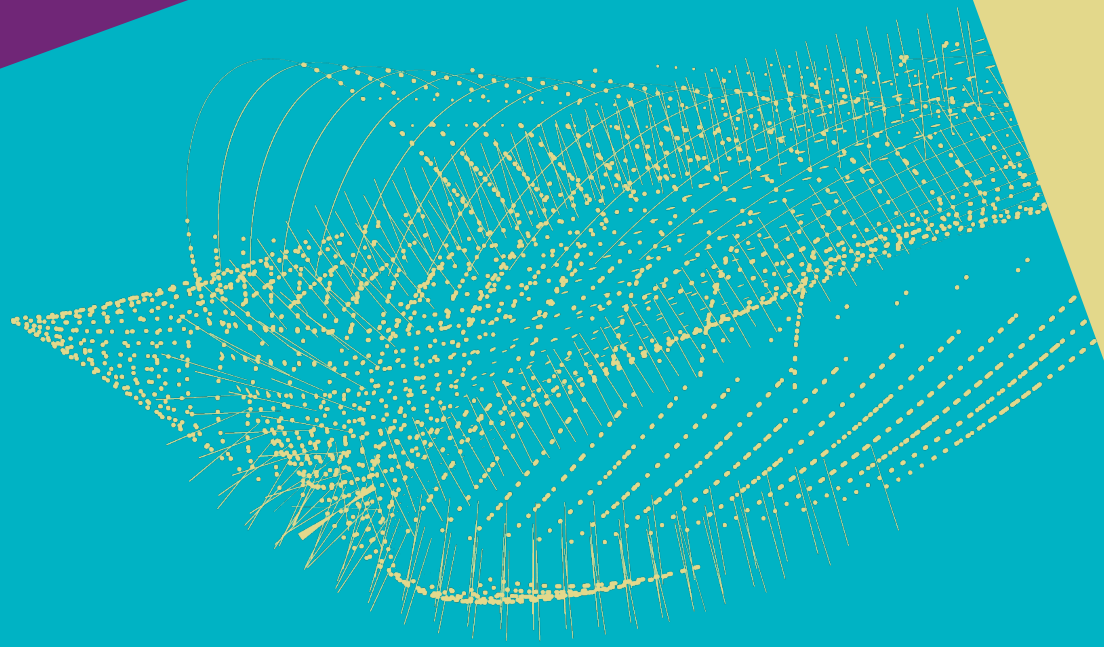
Nikhef

SUBTITEL



ESPPU UPDATE

Tekst

ESPPU

Collect input from our community

- Tuesday October 22nd,
  - 15:00-17:00 hrs, H331
  - Collect pro's & cons for the 5 scenario's for large infra
- Wednesday November 27th
  - 13:00 - 15:00 hrs, H331
  - Second round - emphasis on remaining items

Vista update: Nikhef strategy discussion ~June 2020

- Mid-term update of Nikhef strategy
  - Consequences after the ESPPU has been finalised, in May 2020
  - Role for WAR

EPP Strategy - Vision of the Nijmegen group[1] for the next large European particle physics collider

- We are convinced that the Standard Model is not the ultimate theory for particles and their interactions and that it is highly likely that new particles and/or interactions beyond the Standard Model exist.
- The reach for direct production of new particles at the (HL-)LHC beyond the current limits is limited.
- Precision measurements at the HL-LHC offer a reasonable opportunity to discover at which energy scale new particles and/or interactions may occur.
- The logical next step beyond the HL-LHC is measurements with high-precision, 0.1% on Higgs couplings (excluding the Higgs self-coupling), and at least one order of magnitude more precise than we presently have on Z, W and t properties.
- Second priority aims would be to establish the Higgs self-coupling and the Higgs line-width.
- On the shortest possible term, this is most realistically possible with a high luminosity e+e- collider, however no design presented in the Briefing Book meets our ambitions, primarily in terms of luminosity.

- Therefore, focussed R&D on e+e- colliders is required, e.g. on energy recovering acceleration/deceleration schemes to attain cost- and eco-effectively high energy, final focus to obtain the highest possible luminosity, and to produce a good degree of polarisation to increase effectiveness of precision measurements.
- To validate precision measurements at least 2 independent experiments are required, implying a circular e+e- collider (possibly including energy recovery operation, i.e. with long straight sections) is the best option.
- Europe should pursue its own strategy, not assuming that an e+e- collider with the quality sketched above will be realised in Japan or China.
- For a next generation energy frontier hadron collider, the Nb3Sn magnet development is slow, expensive and not very promising. Scheduling an e+e- collider first would buy time for development of HTSC magnets and alternative schemes such as for a muon collider and/or plasma wakefield acceleration. R&D in these areas should be intensified (e.g. by involving much more the European national labs and universities).
- In parallel to this track mainly aimed at electroweak and QCD addressed beyond the Standard Model physics, precision measurements on neutrino properties should be vigorously promoted, both with accelerator and non-accelerator experiments.
- A diversity programme at CERN, e.g. in the physics beyond colliders context, is secondary to pursuing a new e+e- collider and supporting the neutrino physics programme.

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[1] Nijmegen senior experimental and phenomenological staff: Wim Beenakker, Sascha Caron, Frank Filthaut, Cristina Galea, Nicolo de Groot, Sijbrand de Jong, Ronald Kleiss and Charles Timmermans.

STRATEGY INPUT FROM THE NETHERLANDS

Support the strong ambition for a next e+e- accelerator

- Proposed luminosity should be increased by *10 for permille precision Higgs
  - Europe should draw its own plan and take lead
  - Provide at least 2 interaction points
  - There is room for new ideas and developments beyond the listed scenario's
- CERN should take a leading role in awareness of ecological footprint - make choices based on this

Diversity and R&D

- Pursue a strong R&D program in e+e-, involvement of national labs in coherent way
- Encourage a diversity program whenever it does not jeopardize the e+e- accelerator ambition

Astroparticle physics

- New discoveries, e.g. DM particles help to provide the direction for future accelerators
  - Improve awareness of APP activities - as part of the CERN programme
- CERN facilitates the coordination of astroparticle physics
  - Where overlap exists, CERN should be active in APP
  - Gravitational Waves is a new opportunity for fundamental physics, also for CERN