International Particle
Physics Outreach Group

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WG on Explaining Particle Physics to Lay Audience

(Report from WG meeting 15 November 2021)

https://indico.cern.ch/event/1095722

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How to explain the need for a new e^+e^- collider to the public

How to explain the outstanding physics issues
to the general public, lay persons, decision makers :

- cosmic connection:
  macrocosm: dark energy, dark matter
  microcosm: scalar fields, BSM, neutrinos, …
- How can new e^+e^- colliders (circular and linear) address them?

Need for precision:

- precision / statistics vs energy: Higgs factory ?

Explain open questions of particle physics to the public

- We need to continue to investigate SM with focus on Higgs: something wrong with vacuum!
- Follow the E-M story (Faraday, Maxwell, Lorentz, ether, Einstein, …)
- 21st century: Go from vector to scalar era !
- Watch Higgs at work: mass dependence of couplings, Higgs self coupling, …
- Shape of (effective) potential, (meta)stability of universe
- Electroweak phase transition, symmetry breaking
- Are there more (BSM) Higgs bosons? Higgs decay, parity restauration…
- Hierarchy problem
- Higgs gives mass to fermions, but what about neutrinos: leptogenesis, Majorana neutrinos...

Action plan

- Write short popular document (1-3 pages) for the public, lay persons and decision makers
- Short list of:
  - open physics questions
  - how future machines could answer them
  - potential of new discoveries

Challenge: translation to human language