Addendum to yHEP recommendations on improvement of environmental sustainability in science

Introduction

The young High Energy Physicists Association (yHEP)[1] released *yHEP recommendations on improvement of environmental sustainability in science*[2] in December 2020. Following discussions after the release of the document and feedback received, this addendum is meant to add a few extra recommendations that were left out in the original document.

Sustainability in research funding

Environmental sustainability needs to become an integral part of the way we do research. The goal of reaching net-zero emissions globally in the next 2-3 decades will require changes in all parts of society. Scientific research should be a driver and example for the change.

Funding proposals

Future research proposals should contain a section on measures for improved environmental sustainability of the proposed research project, considering possible equipment, travel, training or other measures. An estimate of the environmental footprint of the research proposal should be given together with the monetary cost estimate. Guidelines for this estimate should be devised to allow for a comparison of the environmental impact of different research projects - taking into account size, number of researchers, area of research, etc. The success of different measures for the reduction or limitation of the environmental impact should be considered in progress or final reports of the funded projects.

Environmental reports

Existing projects should - in the next few years, at the latest on occasion of a funding prolongation request - estimate their environmental footprint and identify areas of possible reduction. Large collaborations should publish their environmental reports, similar to research institutions, or universities, on a regular basis.

---

[1] The yHEP association represents scientists with non-permanent contracts in the fields of astroparticle physics, hadron and nuclei, as well as elementary particle physics. yHEP aims to understand and improve the situation of young scientists, to strengthen their involvement in decisions about the future of the field, and to provide a network of PhD students, post-docs, junior group leaders, junior professors and other non-permanent staff in these fields.
Website: https://yhep.desy.de, contact: yhep-info@desy.de

[2] https://yhep.desy.de/sites/sites_custom/site_yhep/content/e61887/e122133/yHEPStatementonenvironmentalsustainabilityinScience_final.pdf

Green energy

Green power and energy self-sufficiency for universities and research centres

Universities and research centres should obtain their electrical power from renewable sources: solar, wind, water, etc. New buildings should be planned energy-neutral or as energy-plus buildings. The latter implies that the buildings do not only generate their own power, but generate even more than needed for their own usage and insert surplus energy to the local power grid. Older buildings should be modernized to reduce power consumption (including heating) and be upgraded with power-generation units, such as photovoltaic units, to improve their net power consumption. In general, universities and research centres should investigate and identify possibilities for a reduction of power consumption and put corresponding measures in place.

Investments in green research & development

Green accelerators, green detectors

Research and development for environmentally sustainable accelerators and detectors should be promoted and increasingly funded. This includes concepts for accelerators like:

- High energy-efficiency for magnets, accelerating units, etc.
- Recovery of beam energy
- Use of beam dump energy

For detectors, this includes:

- High energy-efficiency of cooling, electronics, sensors, etc.
- Use of environmentally friendly gas-mixtures in gaseous detectors, and a ban on greenhouse gases with significantly larger global warming potential than CO_2, such as environmentally harmful chlorofluorocarbons
- Use of waste heat from computing or other cooling applications

Components for accelerators or detectors in general should be produced, transported, assembled, operated and decommissioned considering environmental sustainability criteria. The full life-cycle should be considered in design and purchase considerations.