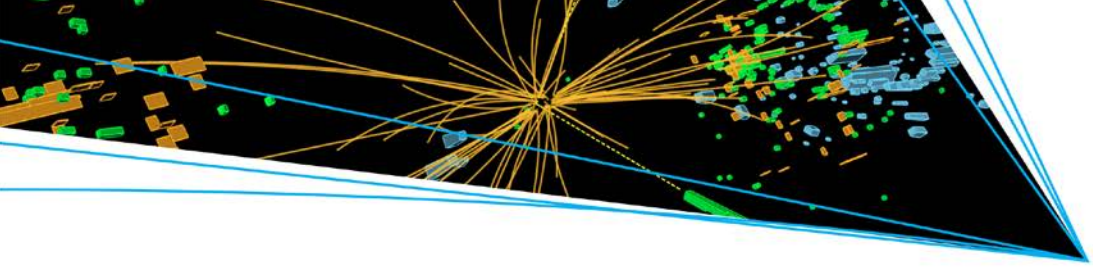

KET
Komitee für
Elementarteilchenphysik

Conclusions of the

KET Workshop on Future e^+e^- Colliders[a]

Max-Planck-Institut für Physik Munich, May 2-3, 2016

1. The physics case for a future e^+e^- collider, covering energies from M_Z up to the TeV regime, is regarded to be very strong, justifying (and in fact requiring) the timely construction and operation of such a machine.[i]

2. The ILC meets all the requirements discussed at this workshop.[ii] It is currently the only project in a mature technical state. Therefore this project, as proposed by the international community and discussed to be hosted in Japan, should be realised with urgency. As the result of this workshop, this project receives our strongest support.[iii]

3. FCC-ee, as a possible first stage of FCC-hh, and CEPC could well cover the low-energy part of the e^+e^- physics case, and would thus be complementary to the ILC.[iv]

4. CLIC has the potential to reach significantly higher energies than the ILC. CLIC R&D should be continued until a decision on future CERN projects, based on further LHC results and in the context of the 2019/2020 European Strategy, will be made.

---

[a] KET contact: Christian Zeitnitz (zeitnitz@uni-wupertal.de), www.ketweb.de
Workshop: indico.mpp.mpg.de/conferenceDisplay.py?confId=4223

[i] Main topics are ultra-high precision tests of the electroweak Standard Model and of Quantum-Chromodynamics (QCD), precision Higgs Physics (mass, width, couplings, self coupling) and precision top-quark physics, which are all well defined and not based on speculation. Apart from these "guaranteed" advancements of our knowledge, precision tests also carry a huge potential towards physics Beyond the Standard Model (BSM), especially through the effects of radiative corrections with sensitivities beyond the TeV region. At high energies these projects are sensitive to the direct observation of physics BSM, complementary to and extending the reach of searches performed at the LHC.

[ii] The basic requirements and features of e^+e^- circular and linear collider projects have been extensively discussed at this workshop, and are summarized, in a simplistic scheme, in the following table:

Topic	CEPC	FCC-ee	ILC	CLIC
Higgs Mass, couplings	+	+	+	+
Higgs self-coupling	-	-	+	+
Top physics	-	+	+	+
ew- precision parameters	+	+	+	-
BSM (direct searches)	-	-	+	+
Flexibility to new high mass signal	-	-	-	+
Maturity of project	-	-	+	-
Start by/before 2035	+	-	+	-

[iii] Technological maturity is reached in general, proven by successful industrial mass production and implementation in the European XFEL, which can be considered as a large scale technological prototype of the ILC. The design provides the possibility of beam polarisation, which is an essential ingredient for precision physics results. The project is under political consideration in Japan. There exist superior detector designs and respective R&D.

[iv] Circular colliders are especially advantageous for efficient measurements with highest statistics at the "low-energy" (M_Z and below) side of the targeted energy spectrum. This "Tera-Z" operation allows to reduce the uncertainties of electroweak parameters substantially, which are an important ingredient for theoretical predictions at high energies. The efficiency of the linear collider projects at M_Z and below is limited and requires substantial effort. This opens the possibility of efficient task- and cost-sharing between circular and linear colliders, if regional considerations and possibilities lead to the realization of more than one project.